NATIONAL PETROLEUM NEWS

Vol. XVIII Cleveland, Ohio, February 24, 1926 No. 8

Great Lakes Refinery to Make Roxana Bigger Contender in Oil Markets

By Paul Truesdell
N. P. N. Staff Writer

CLEVELAND, Feb. 23

BUILDING of a refinery of 15,000 barrels capacity, at the start, at Hammond, Ind., next door to the big Standard of Indiana and Sinclair refineries, will make the Roxana Petroleum Corp. a greater factor than ever in the oil refining and marketing business of this country and Canada.

With a pipe line supplying crude from the Mid-Continent fields, the Roxana company will be in a strong strategic position to contend more actively for the oil markets of Indiana, Illinois, Michigan, Wisconsin, Ohio and western New York, and also Canada.

The Shell interests have always been advocates of using water transportation to the greatest degree possible as the cheapest form of transportation of petroleum products. Following this policy it is likely that the Roxana will use ships on the Great Lakes to an extent other companies have never thought of.

The output of the Roxana's Wood River refinery it is understood will be marketed in southern territory and in the southwest.

Announcement of the intention of the company to build this refinery was confirmed Feb. 18 at the general offices of the Roxana in St. Louis. F. Godber, president, in reply to an inquiry as to the company's plans, sent the following wire to National Petroleum News:

"Have taken option on about 450 acres near Hammond and, if certain ordinances and permits now promised are eventually granted by the cities of East Chicago and Hammond, we intend to erect a 15,000-barrel refinery and pipe line from Wood River to that refinery capable of transporting that quantity of crude oil.

"We expect construction work to be completed by spring of 1927. Total cost approximately $12,000,000."

Steady Expansion

For several years, ever since the Roxana, having developed large production in Oklahoma and Kansas, built its refinery at Wood River, it has been pushing ahead the frontiers of its marketing territory, both in the United States and Canada. The Wood River plant now has a crude capacity of 26,000 barrels a day and a cracking capacity, Dubbs and Cross, of 13,000 barrels a day.

The next step in adjusting its refining capacity to take care of the business it built up was the construction about four years ago of a 16,000-barrel skimming plant at Arkansas City, Kan. The Roxana's policy has been twofold in developing its marketing business; both to build up tank car sales to jobbers and to enter the retail marketing field itself.

The company has accomplished the latter partly by building its own filling stations in certain territories, but more generally has gotten into new districts by buying out established jobbing companies and expanding these.

Gradually, but steadily, the red and yellow color scheme of the Roxana, and the seashell which is the trade mark of all the Shell companies the world over, have been appearing here and there in new states and new localities for a number of years. The building of the new refinery will place the company in favorable position to enter on a big scale territories in which it has been but a limited factor up to now. The site of the new plant is exceedingly advantageous from a number of standpoints. The company has made no statement concerning its marketing plans in connection with the new plant, but many attractive possibilities lie before it. In the first place, the location puts the company in excellent position to go after, on a large scale, the business in the enormous consuming centers of Chicago, the Twin Cities, Milwaukee, and all the rich and populous territory adjacent.

Doorway to Great Lakes

Perhaps the most important possibility is that offered by the refinery's frontage on Lake Michigan. This puts the company in position to ship extensively to all ports on the Great Lakes, Cleveland, Buffalo, Detroit, Toledo, Toronto, Erie, Ashtabula, Conneaut, and many others. Especially it puts the company in position to become a big marketing factor in New York, Pennsylvania and Ohio, where its business now is growing.

The company already has a large retail and wholesale business in Michigan, expecially in Detroit where it operates a large number of stations. This business can be reached to better advantage from Hammond than from the Wood River plant, which is now the Roxana's only source of supply for its Michigan business and trade in states farther east. The Roxana has been associated with the other Mississippi River refiners in all the fights which have been launched in recent years to obtain from the Interstate Commerce Commission a ruling ordering the railroads to make rates from the Mississippi—St. Louis—into Ohio, Indiana, Illinois and states farther east, that were proportional to the long haul rates allowed to the refiners in Group 3 shipping their prod-

ucts into the same territory. The Roxana's latest plans are a striking illustration of how railroads are losing the movement of ore products to cheaper forms of transportation.

Already the company has a large business in Ohio but it is rather scattered. That Cleveland will be very likely the site of a huge bulk plant somewhere on the lake front is given strength by the fact that the Roxana for the last year or so has been exceedingly active in building up business in the state both by selling to jobbers on marginal contracts and by purchasing jobbing companies.

Since last November the company has had a representative from headquarters stationed in Cleveland. With a big bulk storage on the lake front in Cleveland and another, possibly in Toledo, the company would be able to compete almost on even terms with the Standard Oil Co. of Ohio, which has big refineries at both those points from which it distributes gasoline and other products to supply its trade all over the state.

While the Roxana has been a competitor of the Standard of Ohio for some time it was at a considerable disadvantage in the matter of freight rates in shipping from St. Louis.

Already the Roxana has a large business in Buffalo which is handled through the High Grade Oil & Fuel Corp., which has large bulk storage facilities on the lake front and which, it is likely, will continue to handle the Roxana business in that territory.

This company could handle large boat cargoes, transferring them to tank cars in which, by a short rail haul, they could be widely distributed over New York, Pennsylvania and parts of Ohio. From the standpoint of rail shipments, also, the location of the new refinery is a happy one, because it is always desirable to be near the Illinois-Indiana state line, since this line is the boundary between Western Trunk Line territory and Central Freight Association territory.

Mr. Godber's figure of $12,000,000 as the estimated cost of the improvement means an investment of about $900 a barrel of capacity. This probably includes the cost of the pipe line and the possibility is that this may be exceptionally expensive as to acquiring the right of way. Factory sites in the district where it is proposed to locate the refinery are estimated to cost around $1,000 an acre and therefore it seems that the investment in the site alone will come close to half a million dollars.

From the fact that so large a site has been optioned, it would appear that the initial 15,000-barrel capacity is regarded by the Roxana as merely a starter. A 15,000 barrel refinery nowadays can be built on a very small site. With developments that are being made in refinery equipment and developments that undoubtedly will be made, it is likely that a plant of 100,000 barrels capacity could eventually be built on a 450-acre site without crowding.

Compromise Again—27.5 Per Cent Now Depletion Allowance

Staff Special

WASHINGTON, Feb. 22

ALLOWANCE for depletion of an oil or gas well, in the tax year which ended Dec. 31 last, will probably be at the rate of 27.5 per cent of the gross income from such well in that year. If the tax-payer makes his returns on any year other than the one set forth in the calendar he will have to adjust the allowance to fit that year. The limit of such depletion, however, is still 50 per cent of the tax-payer's revenue.

The President probably will have an opportunity to sign the tax reduction bill before the end of this week, so that its provisions will govern tax-payers when they make their returns for the year ended Dec. 31, which returns must be made to the collector of internal revenue not later than March 15. The misleading words "discovery depletion" are not in this bill. They came into the nomenclature of tax legislation because, in the original law, passed in the war period for the encouragement of those hunting for more oil they were used to describe the purpose the law-makers had in mind. They were words of definition of purpose and not definition of the law itself. There is no allowance for depletion other than in the paragraph fixing the rate at 27.5 per cent.

Twenty-seven and a half per cent, the probable allowance, represents a compromise between the representatives of the House of Representatives and the representatives of the Senate, the two classes constituting what is known as a committee of conference on the disagreeing votes of the two houses.

The House of Representatives passed a bill allowing depletion at the rate of 25 per cent of the gross income. The Senate, as set forth in National Petroleum News, Feb. 17, raised the percentage to 30, beating an amendment making it 35 per cent by one vote. The committee appointed by the two houses split the difference and recommended that the allowance be made 27.5 per cent. At the time this was written the conferees had made their report in the form of a bill criss-crossed to show the form in which it passed the House and the form in which it passed the Senate. Subjoined are the paragraphs in which the oil industry is interested, in the form in which they were agreed upon by the conferees. The parts between brackets [ ] were inserted by the Senate and eliminated by the conferees. For instance, the words "30 per centum" enclosed within brackets, not parentheses, were written by the Senate and stricken out, that is recommended to be stricken out, by the conferees, in the interest of harmony between the two houses, which passed the measure with conflicting terms.

Under the existing law when a well is brought in the tax-payer must make an estimate of the amount of oil it will produce and how long it will take the well to cease being commercially worth anything. The estimate of the value of the well at the time of the discovery, divided by the estimate of its life, gives the rate or percentage of depletion that can be allowed in any taxable year. Somebody characterized that operation as multiplying one uncertainty by another uncertainty to ascertain a certainty in the income tax return made by the owner of a well.

As now framed the prospective law will allow depletion at the rate of 27.5 per cent of the gross income per annum from the well during its life, although the representatives of the oil industry who have been here fighting for a depletion allowance believe 27.5 per cent is much less than enough.

The depletion allowance section in which the oil industry is particularly interested is part of the statute under the caption "basis for determining gain or loss, depletion, and depreciation, known as section 204 which says (a) The basis for determining the gain or loss from the sale or other disposition of property acquired after February 28, shall be the cost of such property; except that—

"(c) The basis upon which depletion, exhaustion, wear and tear, and obsolescence are to be allowed in respect of any property shall be the same as is provided in subdivision (a) or (b) for the pur-

Coming Meetings

Western Petroleum Refiners Association, Texas Hotel, Fort Worth, Tex., March 2, 3, 4.

Petroleum Safety Council, Houston, Tex., latter part of March. Dates not set yet.

Wisconsin Independent Oil Jobbers Association, Hotel Pfister, Milwaukee, March 17.

National Petroleum Marketers Association, Congress Hotel, Chicago, April 6, 7, 8.

Petroleum Division, American Chemical Society, Tulsa, April 5, 6, 7, 8, 9.

Association of Natural Gasoline Manufacturers, Mayo Hotel, Tulsa, May 5, 6.

American Association of Petroleum Geologists, The Baker Hotel, Dallas, Tex., March 25, 26, 27.

State Executives Club, Congress Hotel, Chicago, April 6, 7, 8.

pose of determining the gain or loss upon the sale or other disposition of such property, except that—

"(2) In the case of oil and gas wells the allowance for depletion shall be [30 per centum] 27½ per centum of the gross income from the property during the taxable year Such allowance shall not exceed 50 per centum of the net income of the taxpayer (computed without allowance for depletion) from the property, except that in no case shall the depletion allowance be less than it would be if computed without reference to this paragraph.

"[(3) Such intangible value as may be due to the taxpayer's possession of capital, manufacturing ability, operating ability, selling ability, good will, or organization shall not be included in value to be depleted.]"

There is some uncertainty as to just what could be done in the way of depletion in the case of a tax-payer who could show that the out-of-pocket cost, to him, of the well, subjected to the ordinary tests for depletion, would entitle him to a greater allowance for depletion than permitted by the provision for depletion at the rate of 27.5 per cent of the gross income. The weight of opinion seems to be that in such a case the man would not be bound to calculate his income on the basis of the 27.5 per cent provision but might make claim to exemptions on the cost basis. For instance, if a man could show that the lease and the cost of putting down the well was $250,000 and the gross income was only $16,000, depletion of something less than $5,000, if figured under the 27.5 per cent depletion allowance provision, would be taxing him on a losing venture because, in so short-lived a thing as an oil well, a gross return of less than 10 per cent would represent a loss instead of a gain. Therefore, it is generally believed, in such a case the taxpayer could claim the benefit of other provisions of the law and show that he had not made any taxable income from his business as represented by that one well.

Total Motor Fuel Supply 11,239,900,000 Gallons

WASHINGTON, Feb. 20.—The compiling of figures on natural gasoline production and stocks for the past year has made it possible for the Bureau of Mines to give, for the first time, a report on the total supply of motor fuel available to the country.

For 1925 this figure is 11,239,900,000 gallons, a daily average of 30,800,000 gallons. It includes the total production of refinery gasoline, 10,886,100,000 gallons, minus raw gasoline blended at the refinery, 721,900,000 gallons, and minus raw gasolines run through refinery pipe lines, 107,200,000 gallons, which amounted to 10,057,000,000 gallons. To this is added 1,104,900,000 gallons of natural gasoline produced at plants and 78,000,000 gallons of benzol.

NEWS INDEX

National Petroleum News

GENERAL NEWS

Roxana To Build Refinery Near Whiting ---- *By Paul Truesdell* 25
Compromise on Depletion Allowance ---- 26
Prospects for New Amarillo Field ---- *By A. F. Hinton* *28*
Lyons Elected Head of N. P. M. F. I. Company ---- 38
Boyce & Veeder Drop Suit Against N. P. M. A. ---- 95

PRODUCTION NEWS

1925 Industry's Third Billion Barrel Year ---- *By Lawrence E. Smith* 40-A
Watson Re-elected Secretary of Petroleum Division ---- 40-C
Proper Spacing of Wells Discussed ---- 40-D
Community Lease Remedy for Many Ills ---- *By Fay L. Wright* 40-E
Several Phases of Core-Drilling Discussed ---- 40-H
Crude Production Figures ---- 37
Gulf Coast Deep Tests Yielding Results ---- *By Paul Wagner* 53
Corrosion of Pipe Lines and Protective Covering ---- *By F. Ray McGrew* 56
Industry Stressing Engineering Methods ---- *By F. Julius Fohs* 64
Fohs Again Chairman of Oil Division ---- 70
Recovering More Oil From Depleted Fields, Part 2 ---- *By James O. Lewis* 81
Economic Losses in Oil Production ---- *By Lester C. Uren* 85
Billions of Barrels of Shale Oil Available, *By Karl J. Schuyler* 92
California Production on More Stable Basis ---- *By Paul Wagner* 104

REFINING AND NATURAL GASOLINE NEWS

N. P. N. Weekly Western Refinery Figures ---- 34
Big Crowd Expected at W. P. R. A. Convention ---- 35
Cross Wins Suit for Payment of Royalties ---- 36
Cross Interests Buy John C. Black Patents ---- 38
Harry Willock Quits Waverly ---- *By Roger B. Stafford* 39
Pipe Still and Shell Still Compared ---- *By John Primrose* 40-G
Liquid Sulphur Dioxide Useful Treating Process ---- *By Dr. L. Edeleanu* 41
Refining Section of A. I. M. E. Gives Refiners National Forum ---- *By Paul Truesdell* 44
Basic Changes in Refining Processes ---- *By Walter Miller* 60
Great Progress Made in Cracking ---- *By Charles L. Parmelee* 69
Feld Type Scrubber Adopted By Natural Gasoline Industry ---- *By J. C. Chatfield* 75

MARKETING NEWS

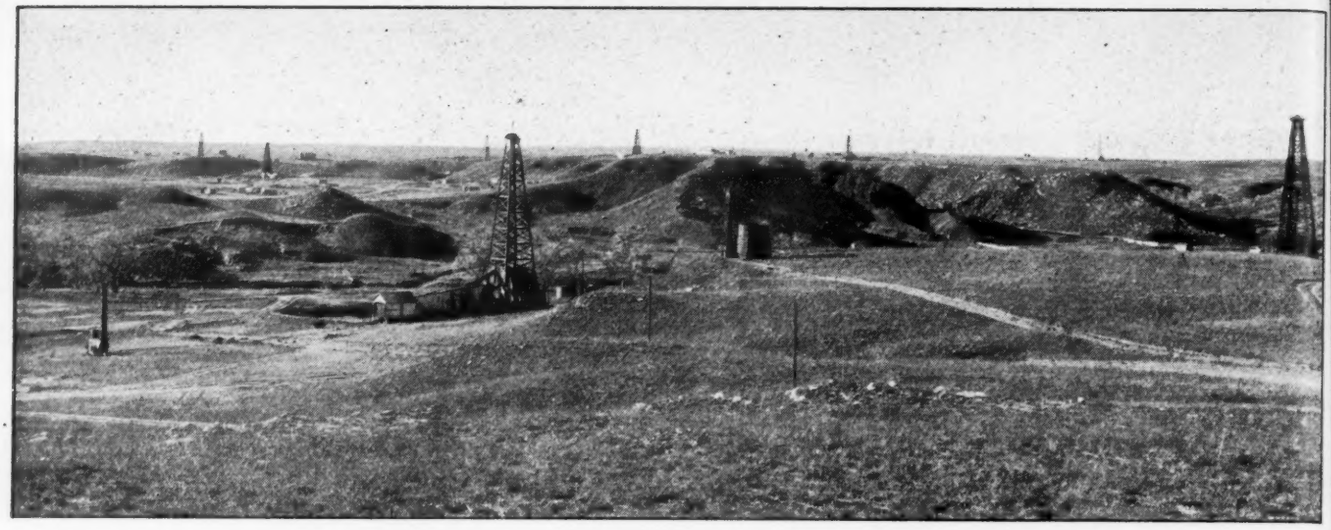
Emig Leaves N. P. M. A. Organization ---- 78
U. S. Uses 83.3 Per cent of World's Passenger Cars ---- 82
Ratio of Gasoline Shipments to Production ---- 95
Attack Petroleum Rates from Southwest ---- 96

MARKETS

Refinery Price Tables ---- 115-117
Tank Wagon Prices ---- 119
Complete Export Markets ---- 120-121
Crude Oil Prices ---- 122
Refiners' and Compounders' Supply Prices ---- 123
Oil Stocks and Finances ---- 124-127

DEPARTMENT NEWS

The Editor's Viewpoint ---- 91
New Oil Station Construction ---- 98
Oil Patents ---- 99
Here and There ---- 100
On The Lazy Bench ---- 109



Typical topography in Carson County, Texas, oil field.

Texas Panhandle Developing Large Field; Amarillo in Midst of Boom

By A. F. Hinton
N. P. N. Staff Writer

AMARILLO, TEX., Feb. 23

IF you want to see all the old gang again, if you want contact with oil men from all over the country, if you desire to be in on a real, old-fashioned, wild-eyed gathering of oil men, the best thing you can do is buy a ticket for Amarillo, hop on the rattler and head for the great west.

At Amarillo you will meet all the bunch from Oklahoma, Texas, and Kansas, as well as from Wyoming and California. No matter what class of the oil industry you desire to associate with, from toolies to superintendents, you'll find lots of them there. Leasers, scouts, contractors, drillers, supply men, pipe liners, lease brokers, all are there, and more are coming every minute.

Amarillo is some fifty-odd miles from its oil field, but the roads are good and this distance means nothing in the lives of these hard-driving oil men. Amarillo is the best town in all the vast stretch of country known as the Panhandle and therefore is the logical oil headquarters. Some twenty-eight miles to the west, on the Santa Fe, the town of Panhandle, Carson county seat, has been selected as the base of supply operations on account of its closer proximity to the field, but Amarillo is where the crowd is.

There can be no doubt that the Panhandle oil field is one of vast potentialities, for enough work has been done to indicate the existence of a large oil-bearing territory. The gas field, if it is ever fully drilled up, undoubtedly will prove to be the greatest in the world. Full development of both the oil and gas fields has been held up and retarded for several years, both on account of the lack of market facilities and demand. As far as the oil field is concerned, it now appears that the time is ripe for its development and signs are not lacking that the big oil-buying companies soon will make transportation facilities available in sufficient capacity to allow the field to proceed under a full head of steam.

Big "Play" Coming

There is every indication now that the Panhandle, and especially the Carson-Hutchinson district where the principal oil production now is located, will see an extensive "play" during the coming summer. There is no reason to doubt that here is a real pool in the making. Already, oil production in these two counties has been established at several points over an area roughly 15 miles north and south and 14 miles east and west, while scattered production has been developed in Gray and Wheeler counties to the east, the farthest being some 60 miles from the main pool. Gas has been developed in all the counties mentioned, as well as in Potter, Moore, and Hartley counties to the west. Altogether, it is some 125 miles from the farthest west gas along the Amarillo Fold to the farthest east production in Beckham county, Okla.

On the way to the field from Amarillo, one travels east on a paved highway along the Santa Fe tracks to the Potter-Carson county line at St. Francis, and the road from there on into Panhandle is hard-surfaced and fast. From Panhandle north, the way leads out into the limitless plains. Driving across these great open spaces resembles nothing so much as an ocean voyage. The horizon is so vast and the solitude so complete that whenever our sea-going sedan dipped gently into one of the swells of the undulating road, I would find myself instinctively looking for the dash of spray from under the bows.

Follows the Rule

One may confidently expect that an oil field, no matter in what part of the country, is almost sure to be located in the roughest and most inaccessible spot in the entire surrounding country, and the Panhandle field is no exception to that rule. After crossing the pasture of the "6666" ranch, a small farm consisting of something like 270,000 acres, the country gets steadily rougher and wilder—and kept getting worse all the way to the Canadian river, which meanders a tortuous course

through the oil field. The field is in typical bad lands, very rugged and badly cut up by arroyos and small canyons surmounted by precipitous hills. It is no cinch hauling material to a location; in fact, one has to know the trails intimately to be able even to drive from one well to another.

The field has been developed so far on a scale of distance no less magnificent than that of the surrounding prairie—and the man who coined the phrase "a country of magnificent distances" must have just returned from a trip through the Panhandle. Producing wells have been completed along a great stretch of country, but large areas of territory between the wells remain undrilled. An oil-man, and especially an Oklahoma oil man, thinks of an oil field 15 miles long as a scene of teeming activity, with derricks crowding close on each other's heels an all the hurly-burly and confusion of rapid field development going on on all sides.

Such a picture would not be true to life in the Amarillo field as it is at present. There the derricks occur in sporadic bunches, separated by stretches of undrilled territory, and with lonesome wildcat wells standing out like guide-posts in the distance to mark the present limits of the field. Out here they call a well an offset if it is within two or three miles of production, and when they speak of two locations they mean somewhere over in the next county.

Amarillo Lively

Amarillo is a hustling and modern city of some 25,000 population, not counting itinerant lease brokers, and, I believe, exclusive of many of the scouts who have come in within the past few weeks.

Hotel lobbies in Amarillo, that of the Amarillo Hotel in particular, are what they are in any town where oil development is under way in the vicinity. They are crowded day and night by a surging throng each member of which has maps in his hand and more in his pocket, and most of whom have money on the brain but none in the pocket. They are talking deals and acreage and production and rumors the same as usual, but with one difference. While we in Oklahoma talk about 40's and 80's and even venture to discuss a 160-acre tract now and then, these fellows out here talk in thousands and hundreds of thousands of acres. When a man tells you that he and his associates have a lease on such and such a pasture, he doesn't mean a section or two under fence—he means anything from 5,000 acres up.

Oil production in the Panhandle dates back to May, 1921, when the Gulf Production Co. drilled in its discovery well, No. 2 Burnette, in section 116, block 5, I. & G. N. R. R. lands, Carson county. Although this was the first well to be completed as an oil producer, it was not actually the Panhandle discovery well, as that was a gas well drilled in September, 1918, by the Amarillo Oil Co. & Hapgood. This well was located in Sec. 65, Block 018, D. & P. R. R. Co., on the Masterson ranch, in Potter county, almost due north of Amarillo, and some 30 or more miles west of the oil discovery location.

Early Field History

The first test to be started for oil in the present limits of production antedated the Gulf discovery well, but lost the hole on account of drilling troubles and the second well was not completed until after the Gulf well had come in. These tests were drilled by Holmes, McIlroy & McGee, all of whom are still operating in the field and living in Amarillo. John W. McGee is a geologist, formerly of Wichita Falls, Tex., and Roswell, N. M., and originally from Eufaula, Okla. He has been a pioneer in geological work in the Panhandle. He has in his possession a structure map showing contours along Dixon Creek, which runs through what is now the heart of the field. The map is dated Oct. 15, 1918. It indicated favorable prospects at the point where the Gulf drilled its first well and also where McGee and his associates finally completed their first well. The original gas well was located by Dr. Charles N. Gould, now director of the Oklahoma Geological Survey.

The Amarillo Oil Co. was formed by local men in Amarillo, and leased 70,000 acres before drilling the first test. Properties of this company afterward were sold to the Prairie Oil & Gas Co. for a reported consideration of $2,800,000, returning a handsome profit to all who had contributed to the organization of the company. Properties of the Amarillo Oil Co. now cover more than 300,000 acres, while the Amarillo Gas Co., also acquired by the Prairie through its absorption of the Producers & Refiners Corp., has vast holdings. The Prairie's own acreage in the district, added to the holdings of these subsidiary companies, make it easily the largest lease-owner in the Panhandle.

Although the first gas well came in in the fall of 1918, no more drilling was done until June 30, 1919, when Holmes et al spudded in their first well on the Smith-Capers ranch. The Gulf spudded in the first test in November, 1919, completing it for a gas well. They then moved about three miles east and drilled what was destined to be the Panhandle's first oil well, completing it in May, 1921, as already stated.

Development Held Back

Development of the field after the discovery well came in was very slow. There were no pipe line outlets and the field was—and is—remote from trunk line facilities. During the years following the discovery, low crude prices and overproduction rode the industry like a millstone around its neck, so that there was no reason why the Amarillo field should have been developed in a hurry.

In spite of the retarded development of the field, some drilling was done and its productive area was gradually pushed out, spreading fanwise to the northeast and northwest from the discovery location. Production crossed the county line into Hutchinson county and opened up an area where acreage was not so closely held by the bigger companies. This resulted in more rapid drilling in that part of the field, as the small operator is ever willing to go ahead and drill his stuff up. Construction of refinery at Amarillo and Panhandle also relieved the situation by providing something of an outlet for the fields production.

Two Oil Formations

As the field progressed northward, two distinct producing horizons were found to exist. Most of the wells in the Carson county or south end, of the field, are producing from granitic wash, so-called, while in the northern portion, the oil is found in the "Big Lime" of the Wichita-Albany series. Practically all the Hutchison county wells are producing from this formation. The oil is found at depth of about 3000 feet,

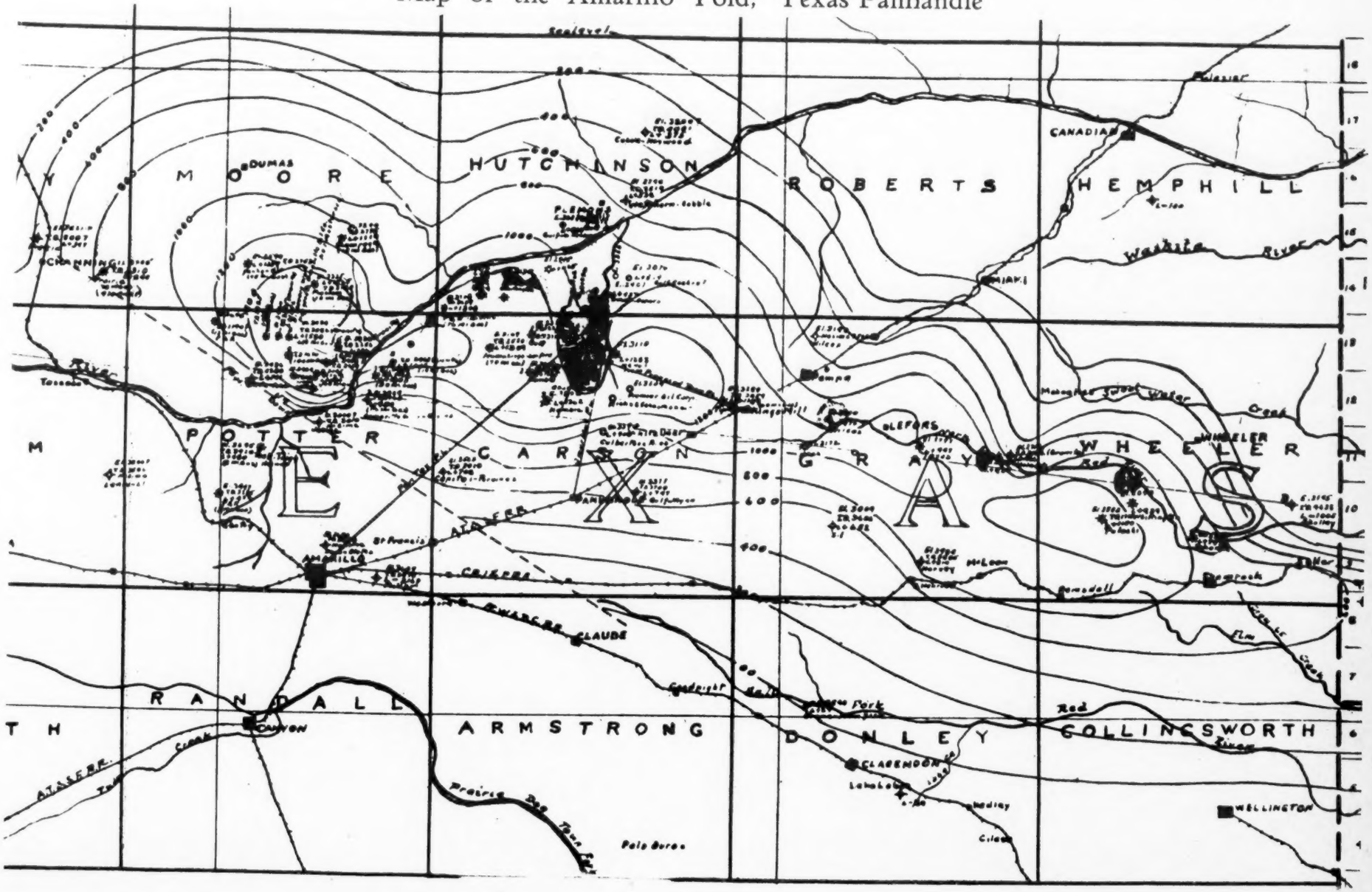
Texas Panhandle Production for Week Ending, Feb. 13, 1926

Company	No. Wells	Daily Average Production	
Carson County			
American Refining Co	3	393	
Crosbie, J. E	2	87	
Gates Oil Co	1	80	
Gulf Production Co	9	188	
Marland Oil Co	4	633	
Silk, W. W	2	91	
Skelly Oil Co	2	230	
Texas Co	8	206	
Total	31	1,908	
Gray County			
Clark et al	1	7	
H. F. Wilcox O. & G	2	152	
Total	3	159	
Hutchinson County			
Barnum	1	16	
Centerfield Oil Co	1	15	
S. Hutchinson Oil Co	1	425	
Crosbie, J. E	1	6	
Dixon Creek Oil Co	2	525	
Douglas Oil Co	2	105	(shut in)
Gibson Oil Co	1	155	
Gulf Production Co	3	156	(shut in)
Middleton et al	1	55	
McIlroy Bros	2	475	
Native Oil Co	1	40	
New Dominion Oil	1	55	
Panhandle Refg. Co	3	35	(shut in)
Phillips, J. R	2	335	
Plains Oil & Gas Co	1	30	
Prairie Oil & Gas	1	65	
Roxana Petroleum Corp	1	82	
Travelers Oil Co	1	95	
Twin Six Oil Co	1	350	
Whittington et al	1	25	(shut in)
Wilson et al	1	25	
Total	29	3,070	
Potter County			
Amarillo Oil Co	1	30	
Wheeler County			
Mid-West Exploration	3	15	
Rook et al	1	54	
Texhoma Oil & Refg	1	4	
Three-N Oil Co.	1	12	
Total	6	85	
Grand Total	70	5,252	

Recent completions drilled in since above report was compiled

Hutchinson County			
Canadian River Oil Co	1	125 bbls 1st hr	
Herring & McIlroy	1	125	
Gulf #1 Whittenberger	1	307 bbls 1st 24 hr	(now 240 bbls)

Map of the Amarillo Fold, Texas Panhandle



Contours by John W. McGee, geologist, Amarillo, drawn on top of "Big Lime" and showing elevations above sea level. Contour interval, 200 feet. For scaling distances on map, Carson county is 30 miles square.

Contours by John W. McGee, geologist, Amarillo, drawn on top of "Big Lime" and showing elevations above sea level. Contour interval, 200 feet. For scaling distances on map, Carson county is 30 miles square.

and from 800 feet to 1000 feet in the lime. This places the oil horizon roughly from 100 to 200 feet above sea level. Where water has been found below the oil horizon, it occurs invariably, and through a coincidence, almost exactly at sea level.

All production so far developed in the Panhandle is found in the Permian series. Starting with the Plains marl in the Eocene series of the Tertiary system, the drill passes through the Dockum beds of the Triassic, going thence into the Clear Fork shales or Red Beds of the Permian. These Red Beds are 1000 to 1500 feet thick in the oil producing field. They become thicker to the eastward and constitute surface formations from a point in Gray county east to the state line. Next to the Red Beds the Wichita-Albany limestone series occur, followed by the Cisco formation of the Pennsylvanian.

Drilling in the Panhandle has shown the presence of numerous buried peaks of intrusive volcanic rocks. This is referred to as granite, although well cuttings have shown a considerable variety of igneous rocks other than granite. It is the theory of geologists that these igneous peaks existed as islands when all this section was a part of the great Permian sea, the upper beds being depositional in character. The granite ridge or series of peaks through the Panhandle are apparently a continuation of the Wichita uplift in southwestern Oklahoma and are on a direct line with the series of granite outcroppings in the Wichita mountains running west and north from Comanche county.

Contours drawn on top of the Big lime from data supplied by the considerable number of wells already drilled in Western Oklahoma and the Texas Panhandle indicate the existence of a very large structure, now known as the Amarillo Fold. Its axis runs roughly N. 70 degrees W., and it is apparently something like 140 miles long. In the vicinity of the oil field it dips at the rate of approximately 50 feet to the mile to the northeast and southwest. It drops off rapidly to the northwest in Moore county, beyond the gas field in that locality. A fault of considerable magnitude, with downthrow of more than 1000 feet to the southwest, is believed by geologists to run southeastward through Hartley, Potter, Carson and Armstrong counties.

All oil production so far found on the Amarillo Fold occurs on the north flank of the anticline and on subsurface contours between 800 and 1200 feet above

Drilling Report Texas Panhandle As Of February 13, 1926

Carson County

Company	Well	Sec.	Block	Status
Amarillo Oil Co.	B-3 Bivins	15	Y-2	Running 8¼ 2875'
Amer Ref Co.	#5 Burnett	115	5	S/D 3030'
Amer Ref Co.	#6 Burnett	115	5	S/D 2030'
Amer Ref Co.	#1-E Burnett	129	5	Shut down
B S Barnes	#1 Burnett	65	5	S/D 1150'
J S Cosdon	#1 Burnett	35	4	Drlg 2272' lime
J E Crosbie	#3 Burnett	114	5	Rig
Culbertson Bros.	#1 Burnett	20	5	S/D 2470'
Gulf Prod Co.	#10 Burnett	106	5	Drlg 1740'
Gates Oil Co.	#2 Burnett	107	5	Drlg out cement 6¾" at 2907'
Magnolia Pet Co.	#2 Burnett	115	5	Drlg 1007'
Marland Oil Co.	A-1 Burnett	116	5	Drlg 1870'
Marland Oil Co.	B-1 Burnett	101	4	Spudded
Premier Oil Co.	#1 Burnett	76	5	S/D 2680'
Rydal Oil Co.	#1 Burnett	107	5	Shut down
W W Silk	#5 Burnett	115	5	Temp. Aband.
Texas Co.	#4 M C Burnett	113	5	Drlg 2508 sdy lime. 200,000' gas 2,500'
Texas Co.	#7 Burnett	132	5	Rigging up

Gray County

Company	Well	Sec.	Block	Status
Anderson et al.	#1 Bradley	124	B-2	S/D 3810 granite
Empire G & F Co.	#1 Heitholf	152	3	S/D for orders. TD 3176. est. 1500' oil in hole.
Clark-Baldridge	#1 Merten	82	3	Location
Texas Co.	#1 Brown	137	3	Rigging up
Texas Co.	#2 Saunders	3		Drlg 165'
Wilcox O & G Co.	#2 Coombs-Worley 330' fr S line and 1320' fr W line	59	3	Spudded 2-12-26
Wilcox O & G Co.	#3 Coombs-Worley 330' fr S line and 1320' fr W line	62	3	Drlg 2650'

Hutchinson County

Company	Well	Sec.	Block	Status
American Ref Co.	#1 Weatherly	18	Y	S/D TD 3325'
American Ref Co.	#1 Whittenberg	Keulin Tract		Drlg red bed at 1700'
Canadian Riv Oil.	#1 Kingsland	4	Y	TD 2936' Sdy lime-flowing about 100 bbls.
Canyon Oil Co.	#1 Whittenberg	12	Y	Fsg 10" 2310'
Canyon Oil Co.	#2 Whittenberg	13	Y	Drlg lime 2560'
Centerfield	#1 Smith	10	Y	C/O and swabbing. No estimate.
Jack Crosbie	#1 Whittenberg	12	Y	Drlg 2000'
Cockrell-McIlroy	#1 Smith	14	Y	Location
Cockrell-McIlroy	#2 Smith 330' each way fr NE Cor E½ SW¼	14	Y	Location
Dixon Creek	#2-A Smith	11	Y	Making 550 bbls.
Dixon Creek	#3 Smith	11	Y	Rig
J E Drysdale	#1 Weatherly	17	Y	Drlg lime 2670
Dunnigan et al.	#1 Whittenberg	13	Y	Drlg red bed 1400'
Gates Oil Co.	#1 Kingsland	4	Y	Drlg red bed 1800'
Gates Oil Co.	#2 Kingsland	4	Y	Cellar
Gibson Oil Corp.	#1 Johnson	74	46	Location
Gibson Oil Corp.	#2 Whittenberg	62	46	Drlg 350'
Gibson Oil Corp.	#1 Whittenberg	63	46	Drlg lime 2780' 4 M gas 2740'
Gibson-McMillen	#1 Kingsland	6	B-4	S/D water 200'
Gibson-McMillen	#1 Whittenberg	M Whitley Sur.		Drlg sand 1450'
Golding-Phillips	#1 Hodges	1-A	M-26	Rigged up
Gulf Prod Co.	#1 Cockrell	3	Y	Drlg 2325 lime
Gulf Prod Co.	#1 Whittenberg	M Whitley Sur.		TD 2929' C/O & Swab. 114 bbls. 1st hr. Sand 2921-29. Will dri l deeper
Heywood et al.	1-A Cockrell	10	B-3	Location
W H Holmes	#1 Smith	12	Y	Drlg 1900'
Hutchinson Oil Co.	#1 Smith	8	Y	S/D for 6¾". TD 2850'
W E Lennix et al.	#1 Smith	11	Y	S/D 2680'
McIlroy Oil Co.	#2 Smith	5	Y	TD 2885'. 210 qt. Shot 2-11-26 at 2815-2885 Syd lime. 125 bbls. flowing 1st hr. No gauge since.
McIlroy-Herring.	#1 Smith	5	Y	TD 2888'. Swabbing 10 bbls. hr. sdy lime 2774-2838.
McKinney-Bayer.	#1 Weatherly	17	Y	Drlg 3020 good show oil.
J H Middleton	#2 Weatherly	18	Y	TD 3248' Plug back to o/s 3044-65
J H Middleton	#3 Weatherly	17	Y	Location
J H Middleton	#1 Smith	15	Y	Rig
Miller-Wetzel	#1 Whittenberg	13	Y	Moving boiler back. TD 2570'
Newby Oil Co.	#1 Cockrell	3	Y	Drlg 200'
J R Phillips	#1 Weatherly	18	Y	Pulling big pipe. TD 2418'
Phillips-Currie	#1 Smith	14	Y	Drlg lime 2415'
Phillips Pet Co.	#1 Johnson M	Whitley Sur.		Drlg lime 2670'
Phillips Pet Co.	#1 Whittenberg	12	Y	Drlg red shale and sand 840'
Phillips Pet Co.	#2 Whittenberg	12	Y	Drlg 620'
Prairie O & G Co.	#1 Johnson	22	Y	Drlg brkn lime at 2800'
Prairie O & G Co.	#2 M Weatherly	23	Y	C/O after running 10".
Pulaski Oil Co.	#1 Johnson Mary	Whitley Sur.		Rigged up
Pulaski Oil Co.	#2 Smith	5	Y	8¼" 2135'
Pulaski Oil Co.	#3 Smith	5	Y	S/D 265'
Pulaski Oil Co.	#1 Cockrell	2	Y	Drlg 700'
W R Ramsey	#1 Johnson	3	1	Drlg 880'
Roxana Pet Corp.	#2 Smith	1	Y	Location
Roxana Pet Corp.	#3 Smith	11	Y	Location
Geo Smith et al.	#1 Lyal	33	2	Location
Skelly Oil Co.	#1 Whittenberg	Tract 22		Drlg 900'
Skelly Oil Co.	#2 Whittenberg	Tract 22		Rigging up
Skelly Oil Co.	#3 Whittenberg	Tract 22		Rig
Skelly Oil Co.	#4 Whittenberg	Tract		Bldg rig
So Hutch Oil Co.	#2 Whittenberg	13	Y	S/D 2855'
So Hutch Oil Co.	#3 Whittenberg	13	Y	Drlg limey shale 1850'
Relief Oil Co.	#1 Smith	11	Y	Bldg rig
Texas Co.	#1 Cooper	6	9	UR 12¼" 555' 15¼" at 559' TD 670'
Tex-O Oil Co.	#1 Johnson Tomlinson	Sur.		Fishing TD 2080
Travelers Oil Co.	#1 Kingsland	5	Y	Making 95 bbls.
Twin-6 Oil Co.	#2 Kingsland	6	Y	Fishing 2431
Twin-6 Oil Co.	#3 Kingsland	6	Y	Spudded and S/D
Twin-6 Oil Co.	#4 Kingsland	6	Y	Drlg lime 2500'
Triangle Oil Co.	#1 Smith	5	Y	Derrick
J D Ward	#1 Cockrell	3	Y	Drlg 620'
Westex Oil Co.	#1 Whittenberg	13	Y	Drlg 2600'
Westex Oil Co.	#2 Whittenberg	13	Y	Drlg 2090'
White Eagle O & R Co.	#1 Smith	11	Y	Rigged up
White Eagle O & R Co.	#1 Johnson 330' each way from NE Cor S 400 acres			
(Corrected location)		64	46	Bldg rig
Winner Oil Co.	#1 Pritchard	3	B-4	Location

Moore County

Company	Well	Sec.	Block	Status
Amarillo Oil Co.	#1 Masterson	49	G&M 3	Drlg 2485'
Cadman & Martin	#1 Sneed	68	3	Location
Landreth Prod. Corp.	#1 Sneed	660' each way from SW Cor NE¼ N Jones Sur. adjoining Sec. 5, Blk B-12 on East		Location

Potter County

Company	Well	Sec.	Block	Status
Amarillo Oil Co.	4-A Bivins	24	018	Drlg granite 2911'
Prairie O & G Co.	#1 Bivins	42	20	C/O 2648'

Roberts County

Company	Well	Sec.	Block	Status
Big Bend Oil Co.	#1 Ledrick	7	A-5	S/D 4017 shale

Wheeler County

Company	Well	Sec.	Block	Status
Midwest Exp Co.	#1 Company	12	27	Fsg. TD 2985'
Midwest Exp Co.	#2 Porter	14	27	Location
McFarland & Thomas.	#1 Ketchelhoffer	70	27	Drlg granite wash 2325'

sea level. Gas is found on top of the structure. On the south flank no oil has been found, and, except for two gas wells in Potter county, located beyond the fault already mentioned, all drilling on the south flank has resulted in failures. One of the remarkable features of Panhandle gas and oil production has been the remarkably low and equally remarkably consistent rock pressure, which has been very close to 435 pounds in every well drilled into gas. The "Big Lime," in which oil is found in the Panhandle, is the same formation as that productive in the central and western Texas fields along the Bend Arch and Marathon Fold areas. It also is productive in the Artesia field of New Mexico.

Present Production

Up to the time of writing this article, 73 wells capable of producing oil had been completed in the Texas Panhandle, and these wells made only a little better than 5000 barrels a day during the week ending Feb. 13, as shown in the accompanying table. It is hardly fair to the field, however, to state its production in this manner, as practically every operator believes that the wells now on production could be made to produce some 10,000 to 12,000 barrels if worked to full capacity. A number of wells are shut in on account of lack of pipe line facilities and it is a matter of guesswork as to what their maximum production would be if they could be cleaned out, shot and operated to their greatest capacity. Many other wells are allowed to rock along on small production for the same reason, there being no reason to increase their output until such time as all their oil can be run. Up to Jan. 1, 1926, the Panhandle had produced approximately 1,340,000 barrels of crude.

Most of the wells shut in altogether on account of no market outlet are those located on the north side of the Canadian river, which cuts through the field and offers a serious impediment to pipe line construction. So far, eight wells have been completed across the river, all of them have filled available storage and none was on production last week. It is reported in Amarillo that the Pantex Pipe Line Co. was planning to lay a line across the river in the near future.

New Pipe Line Outlets

Pipe line outlets for Panhandle oil at present consist of only a six-inch line owned by the Pantex and running to Amarillo and a four-inch line of the Plains Pipe Line Co., running to Panhandle. The Pantex line draws crude from both the Carson and Hutchinson county fields. Its line supplies the refinery of the Amarillo Refining Co., a plant of 5000 barrels daily capacity, and has also been used for common carrier shipments by the Marland interests. The Panhandle plant is operated by the Sullivan Refineries, Inc., and has estimated capacity of 1000 barrels.

The Marland Oil Co. recently entered the field as a buyer of crude, and it is believed it will soon start construction of its own line from the field to a loading rack whence its oil will be shipped to its Ponca City refinery. This company already has let contracts for the erection of seven 55,000-barrel tanks, six to be located in the field and one at the loading rack. Magnolia Petroleum Co. has bought land which it is believed it will use as a tank farm site, and is reported to have shipped enough six-inch pipe to lay from the field to its tank farm. The Empire Gas & Fuel Co. has also purchased fee property along the Santa Fe which it probably will use as a tank farm site. It is reported that Marland has contracted to buy one million barrels of crude from the Dixon Creek Oil Co., if, as, and when produced. This company has production in the heart of the field.

In order to connect the Amarillo field with existing trunk pipe lines it will be necessary to construct a minimum of some 220 miles of line, and, owing to the character of the crude, a line of large diameter will be required. It is about 230 miles from the field via Panhandle to Enid, where the Sinclair line could be connected with, and some 278 miles to Ponca City. From Panhandle to Wichita Falls is about 200 miles, so that this is the shortest distance to a main pipe line area.

A Co-Operative Pipe Line?

Building this amount of line will be an expensive proposition and it is probable that no company will start on such a project until the field's status has been more definitely established. One proposal, in the meantime, has been under consideration for some months, by which the major pipe line companies will operate a joint line to Wichita Falls. This was proposed by W. M. Priddy, of Wichita Falls, president of the American Refining Co., vice president of the City National Bank, and widely interested in oil and other industries. His idea is to construct a 12-inch line, forming a stock company for the purpose, and selling 65 per cent of the stock to the major pipe line companies who come in on the deal. These companies would manage and operate the line and would decide among themselves as to distribution of the oil carried through the line. It is not known whether this proposal has received serious consideration from the major companies.

Scouts at Amarillo

Here's at least a partial list of oil scouts now stationed at Amarillo, all of whom make the lobby of the Amarillo Hotel in the evenings. The list does not contain the name of "Buddy" Lowe, of the Empire, who is vice-president of the National Association of Oil Scouts of America, because that gen.leman has graduated into a lease buyer—but he's in Amarillo, along with the rest o: them. Look them over:

E. C. Stinson, Empire Gas & Fuel Co.
G. J. Sevier, Pure Oil Co.
I. W. Ross, Prairie Oil & Gas Co.
George Pratt, Gulf Production Co.
George Milton, Texas Co.
Phil Gardner, Skelly Oil Co.
Claude Hildebrant, Phillips Petroleum Co.
Fred Oglesby, Roxana Petro'eum Corp.
Frank Logan, Landreth Production Co.
Hoyt Lewis, Marland Oil Co.
T. M. Cady, White Eagle Oil & Refining Co.
Bill Todd, Humble Oil & Refining Co.
C. A. Markey, Mid-West Exploration Co.
Nate Isenberg, I. T. I. O. Co.
Smith, Ryan Oil Corp.
Wallace, Wentz Oil Corp.

Amarillo crude has a very high paraffin content, causing it to congeal at about 56 degrees F., and this is another feature that has retarded development of the field, as this condition makes the oil more than ordinarily difficult to handle through pipe lines, as well as causing trouble in the wells. However, those companies that have been operating pipe lines in the field state that the oil is handled satisfactorily if the line is of sufficient diameter and the oil is kept moving, after having been heated somewhat before being started through the line. In the wells, the usual artifices to get rid of paraffin accumulation must be employed if the production is to be kept up to maximum, but ordinarily this has not been done in the field, due to the fact that lack of pipe line outlets discouraged development of maximum production.

Characteristics and Price of Crudes

Average gravity of Panhandle crude is 36 degrees Be., with a range of from around 30 to about 41. Posted prices figure about 75 per cent of those prevailing in the Mid-Continent field. On Feb. 15, Marland posted a set of prices for the field, making them retroactive to Feb. 1, in which all grades were increased 10 or 15 cents. These prices are as follows:

		Increase
Below 30 gravity	$1.15	10c
31-33.9	1.30	10c
34-36.9	1.50	15c
37-39.9	1.65	15c
40 and over	1.70	15c

Panhandle crude contains 27 per cent of U. S. Motor gasoline by laboratory distillation, about 12 per cent kerosene distillate, 18 per cent gas oil, and from 1 to 3 per cent sulphur. The oil has a high lubricant content, but the presence of so much paraffin would make manufacture of lube oils an expensive proposition. The crude makes an ideal cracking stock. The Amarillo Refining Co., which is owned by Reese S. Allen, of Wichita Falls, and of which W. L. Rowsey is general superintendent, is making about 80 per cent of its gasoline output into export grade of 64-66 gravity, 375 e. p. This is being sold to the Standard Oil Co. of New Jersey through the Carter Oil Co. This company also makes U. S. Motor gasoline which is marketed locally, and has a contract with the Santa Fe railway under which the latter takes its entire output of fuel oil. The smaller refinery at Panhandle is shut down at present owing to scarcity of water, but is drilling water wells and will soon resume operations.

Low Rock Pressure

It is likely that Panhandle wells will not flow over as long a period of time as is usual in other fields when intensive drilling has succeeded the past lethargic development, this belief being based on the low rock pressure of the gas, which would indicate an early exhaustion of the expulsive agent. Formation of so much paraffin in the wells undoubtedly will make pumping them a more difficult proposition than in fields not so handi-

capped, as frequent measures will have to be taken to remove the accumulation. However, some remarkable records have been made by flowing wells in the field, aided by swabbing, cleaning out and infrequent shooting. A record of one of these wells will serve to show that the Panhandle is capable of sustained production.

What is probably the best well performance is that recorded by the Jim Ward & Twin Six Oil Co. well on the Kingsland ranch, in Sec. 6, Block Y. This well was drilled into the sand in December, 1924, and flowed 70 barrels daily for 105 days thereafter from a slight penetration into the oil pay. In March, 1925, it was cleaned out and deepened about three feet, after which it started off flowing 216 barrels a day. It kept up this production with little decline until July, when it went down on account of paraffin accumulation. It was then again cleaned out and deepened six feet farther after which it started off flowing at the rate of 20 barrels an hour. At present, the well is about 14 months old, and is flowing 350 barrels daily. It was said the company was preparing to clean it out again this week and to give it a shot. One remarkable feature of this well's performance is that it has 792 feet of open hole. The 10-inch casing was set at 2170 feet and oil pay topped at 2962 feet.

It is the general opinion in Amarillo that cable tools will be almost universally used in development in the field. Only one operator, the American Refining Co., has been using the rotary, and that method of drilling apparently has not been an unqualified success. However, the rotary has succeeded in other fields where its failure seemed assured, and it is possible it will make the grade here, with more experience and wider knowledge of the problems involved in drilling in this field.

Drilling Methods

Cable tool drilling is rather tough going and many wells have been improperly drilled on account of lack of knowledge of the formations to be contended with, which is a usual characteristic of early wells in a new field. Wells are now being put down in better time and with less difficulty and fewer fishing jobs than formerly, some having been completed in about 45 days' drilling time. Average drilling time for the field is probably between 60 and 70 days. Gas is plentiful and cheap, but water is scarcer, and usually must be bought, the two together costing about $25 a day. Until quite recently, when a few turnbuckle derricks were erected, the field has been drilled altogether with standard timber derricks. The first turnbuckle derrick in the field was erected by the Ponca Rig Co. of Tulsa. At the head of this company is J. L. Pattison, who, with his associates, is drilling a well in the Hutchinson county field.

The average cost of drilling a Panhandle well is probably somewhere around $40,000. Contract prices for drilling with cable tools are $5.00 or $6.00 a foot, according to the location of the well, it being more difficult to drill toward the west end of the field on account of the big gas. I heard while in Amarillo that some contracts had been let for completion of wells on a turnkey basis for $36,000, all casing run into the hole becoming the property of the operator whether recovered or not.

Six Strings of Casing

The average Panhandle well uses six strings of casing, which will probably cost around $23,000, with teaming expense of $700.00. Starting with 200 feet of 20-inch, 90-pound casing, a typical well goes on down with 550 feet of 15½-inch, 70-pound, 1200 feet of 12½-inch, 50-pound, 2150 feet of 10-inch, 45-pound, 2800 feet of 8¼-inch 32-pound, and 3000 feet of 6⅝-inch, 24-pound casing. The 8-inch is always cemented, and sometimes the 6-inch, the other strings being pulled on completion of the well. On account of troublesome quicksand formations, it is necessary to drive the 20-inch and 15-inch strings and sometimes the 12½-inch, which adds considerably to the expense of running pipe. It is reported that some operators are using plain-end pipe for these strings, welding the joints as the pipe is driven.

Phillips Petroleum Co., of Bartlesville, largest manufacturer of natural gasoline, recently acquired the only gasoline plant in the Panhandle field and is building another. The present plant formerly was owned by the American Gasoline Co. It now has capacity to handle 15 to 20 million cubic feet of gas daily and at present is making about 8000 gallons of gasoline daily. The new Phillips plant, located in the north end of the field, where the company is a large lease owner, is in process of construction with material on the ground. The company is busy lining up gas all over the field and has not determined what the final size of the new plant will be. Casinghead gas in the field is said to test from 0.59 to 0.89 gallon per thousand feet.

Phillips Petroleum Co. also is active in production development in the north end of the field, operating its own acreage and that of the Pulaski Oil Co. as well. Although confirmation is not yet available, it is reported on good authority that the company is acquiring the properties of the South Hutchinson Oil Co., one of the most prominent companies organized by Amarillo men. Phillips is said to have offered one million dollars for this company's 400 acres in the N½ Sec. 13 and the S½NW of 12, block Y. The Hutchinson company has one well making 425 barrels daily on the smaller lease and is drilling two in the larger property. The transaction involved the payment of $400,000 in cash and one-third of the oil produced until balance is paid.

Acreage is very high inside present productive limits of the field, some of it having sold recently for more than $1000 an acre. However, there is plenty of room for outside plays and one can speculate in leases at whatever price fits his purse if he doesn't mind getting out into virgin territory. All of west Texas and the Panhandle country of both Texas and Oklahoma are in line for a big drilling campaign during the coming summer, and I will hazard the guess that Amarillo is going to be a busy place for some time to come.

Supply Company Roll Call

A hurried survey of the trackage district of Panhandle, seat of Carson county, which has become the supply base of the field, showed the following outfits already housed and looking for orders; Frick-Reid Supply Co., National Supply Co., Oil Well Supply Co., Hinderliter Tool Co., International Supply Co., Black, Sivalls & Bryson, Parkersburg Rig & Reel Co., Continental Supply Co., Tulsa Rig & Reel Co., Bridgeport Machine Co., and Panhandle Tank Co. Jarecki Supply Co. is building a store in Panhandle, and I ran into H. L. Ellis, who, with Bob Cole of Wichita Falls, was looking for a location for the Republic Supply Co. Frank Monahan, of the D. F. Connolly Agency, was in Amarillo trying to find out what it was all about. Longhart Supply Co., of Fort Worth, also is getting established to serve the territory. They were coming in so fast that it is quite likely this list is all out of date now.

Buys Terminal Properties; To Erect Storage

QUINCY ADAMS, MASS., Feb. 20.—Erection of 1,000,000 gallons storage which will enable the Quincy Oil Co. to receive oil shipments by boat from any part of the world, will be started by that company at once. Two wharf properties at Chelsea have been purchased and spur track privileges have been secured for re-shipments throughout New England, according to E. C. Mahoney, secretary to Fred E. Bergfors, manager and treasurer.

A corporation to handle the terminal business was recently formed, composed of Joseph A. Maynard, president; Fred E. Bergfors, treasurer and secretary; and William C. O'Meara, director.

Mr. Maynard was port collector under the late ex-President Wilson's administration and was also chairman of the state Democratic committee. He is a director and officer in several banks and businesses and most of his activities are confined to the Waltham Brass Works.

Mr. O'Meara was formerly assistant treasurer of the New England Oil Refining Co., Boston, and became associated with the Quincy companies less than a year ago.

Mr. Bergfors is well-known to the oil industry generally and in New England particularly. He is a director of the National Petroleum Marketers Association and was recently elected president of the Independent Oil Men's Association of New England, Inc.

Compilation Of Mid-Continent Refinery Operations

All Rights Reserved to National Petroleum Publishing Co.

National Petroleum News

Stocks of All Principal Products Except Gasoline Decrease

Special Wire Service

TULSA, Feb. 23

WITH the exception of gasoline stocks of all principal commodities manufactured by 124 Mid-Continent refineries were reduced substantially during the third week of February, according to figures gathered by National Petroleum News. Gasoline stocks increased approximately 3,000,000 gallons when shipments fell 1,000,000 gallons below the record of the second week of the month.

Fuel oil led the list in point of withdrawal from storage. Shipments for the week were 31,712,892 gallons and production 26,906,435 gallons with the result that stocks were reduced nearly 5,000,000 gallons. Fuel oil stocks at Oklahoma plants increased slightly but all other groups reported big cuts. Since Jan. 1 the 124 reporting plants have cut fuel oil stocks 12,000,000 gallons.

With the exception of the Texas group all districts reported reductions in kerosene stocks. Texas stocks increased only 68,000 gallons.

Due to the waning season for home heating distillates refiners are not making much of that commodity and have been working down their stocks rapidly since Jan. 1. Shipments were 2,909,477 gallons and production 1,408,287 gallons, bringing stocks down to 4,983,271 gallons. This is a reduction of 10,000,000 gallons since Jan. 1 and stocks now represent only 10 days' supply at the current rate of shipments.

Summary for the Month

Production and shipments all reporting refineries, for four weeks, ended Feb. 19. Change in stocks figured from Jan. 22.

	Gallons
Gasoline	
Production	117,905,481
Shipments	106,403,195
Net change in stocks	+11,502,286
Ratio sales to production	90.2%
Kerosene	
Production	20,197,080
Shipments	20,974,490
Net change in stocks	—777,410
Ratio sales to production	103.8%
Stove Distillate	
Production	6,609,634
Shipments	12,775,476
Net change in stocks	—6,165,482
Ratio sales to production	193.3%
Gas Oil	
Production	23,386,628
Shipments	26,656,447
Net change in stocks	—3,269,819
Ratio sales toproduction	114.0%
Fuel Oil	
Production	105,742,175
Shipments	118,823,756
Net change in stocks	—13,081,581
Ratio sales to production	112.4%

Mid-Continent Refinery Operations Week Ended Feb. 19 (By Fast Wire)

	Kansas	%Change Previous Week	Oklahoma	%Change Previous Week	No. & Cent. Texas	%Change Previous Week	No. La.-Ark.	%Change Previous Week	Total	%Change Previous Week	Totals Week Ended Jan. 22
Plants Reporting	23		46		41		14		124		124
Daily Cap. (Bbls)	98,200		165,900		144,300		51,700		460,100		460,100
Da. Av. Crude Runs	47,019	+ 0.1	104,309	+ 2.1	60,309	+ 6.3	35,855	—11.2	247,492	+ 0.5	252,282
Da. Av. Other Oils	4,150	+194.7	632	.....	3,634	—21.5	612	+67.6	9,028	+56.4	8,514
GASOLINE—Gallons											
Stocks Feb. 12	11,389,873		51,896,378		17,799,901		4,865,836		85,951,988		72,532,308
Prod. 2-12 to 2-19	7,364,502	+ 2.4	14,081,511	+ 4.5	6,446,505	+ 2.8	2,342,380	—13.1	30,234,898	+ 2.1	30,693,514
Ship. 2-12 to 2-19	6,189,514	—20.4	11,939,326	— 7.1	7,059,901	+18.7	1,958,507	— 4.4	27,147,248	— 5.2	25,688,470
Stocks Feb. 19	12,564,861	+10.3	54,038,563	+ 4.1	17,186,505	— 3.4	5,249,709	+ 7.9	89,039,638	+ 3.6	77,537,352
Ratio Sales to Prod.	84.0%		84.8%		109.5%		83.6%		89.8%		83.7%
KEROSENE—Gallons											
Stocks Feb. 12	1,164,705		5,027,736		1,311,332		463,227		7,967,000		8,242,417
Prod. 2-12 to 2-19	968,438	— 4.5	2,126,171	—16.5	1,036,864	—18.1	311,954	—39.5	4,443,427	—16.8	5,174,484
Ship. 2-12 to 2-19	975,902	—20.4	2,588,455	+ 8.8	968,647	—37.4	465,812	+ 6.5	4,998,816	—10.6	5,227,880
Stocks Feb. 19	1,157,241	— 0.6	4,565,452	— 9.2	1,379,549	+ 5.2	309,369	—33.2	7,411,611	— 7.0	8,189,021
Ratio Sales to Prod.	100.8%		121.7%		93.4%		149.3%		112.5%		101.0%
STOVE DISTILLATE—Gallons											
Stocks Feb. 12	1,684,749		4,385,465		389,173		25,074		6,484,461		12,116,026
Prod. 2-12 to 2-19	611,385	—12.3	475,858	—27.9	314,366	—35.4	6,678	—68.4	1,408,287	—24.5	1,458,998
Ship. 2-12 to 2-19	1,074,177	+ 4.9	1,433,839	+15.3	392,137	—37.8	9,324	—74.7	2,909,477	— 0.9	2,425,911
Stocks Feb. 19	1,221,957	—27.5	3,427,484	—21.8	311,402	—20.0	22,428	—10.6	4,983,271	—23.2	11,149,113
Ratio Sales to Prod.	175.7%		301.3%		124.7%		139.6%		206.6%		166.3%
GAS OIL—Gallons											
Stocks Feb. 12	3,730,805		33,759,065		6,606,300		6,034,184		50,130,354		55,625,411
Prod. 2-12 to 2-19	1,388,450	+ 7.4	1,665,684	—30.6	201,720	+55.5	1,867,277	— 9.0	5,123,131	—12.8	6,292,875
Ship. 2-12 to 2-19	1,560,227	+80.3	1,536,896	+75.2	751,846	+53.8	1,988,616	—12.4	5,837,585	+29.6	9,232,567
Stocks Feb. 19	3,559,028	— 4.6	33,887,853	+ 0.4	6,056,174	— 8.3	5,912,845	— 2.0	49,415,900	— 1.4	52,685,719
Ratio Sales to Prod.	112.4%		92.3%		372.7%		106.5%		113.9%		146.7%
FUEL OIL—Gallons											
Stocks Feb. 12	11,420,922		47,934,352		23,486,151		13,771,904		96,613,329		105,937,586
Prod. 2-12 to 2-19	4,252,416	+ 0.3	8,926,707	+ 3.5	7,908,951	+ 0.2	5,818,361	— 5.0	26,906,435	+ 0.1	27,745,330
Ship. 2-12 to 2-19	4,931,680	+ 5.0	8,409,489	—23.3	8,861,400	— 2.2	9,510,413	+30.9	31,712,982	— 0.9	28,794,553
Stocks Feb. 19	10,741,658	— 5.9	48,451,570	+ 1.1	22,533,702	— 4.1	10,079,852	—26.8	91,806,782	— 5.0	104,888,363
Ratio Sales to Prod.	116.0%		94.2%		112.0%		163.5%		117.9%		103.8%

Big Crowd Expected For W. P. R. A. Convention

By J. C. Chatfield
N. P. N. Staff Writer

TULSA, Feb. 23.

ADVANCE hotel reservations and special preparations by the railroads indicate that attendance at the annual convention of the Western Petroleum Refiners Association at Fort Worth, March 2, 3 and 4, will be the largest in the history of the organization. It is estimated by Howard Bennette, managing director, that the registrations will be between 400 and 500. A year ago at Kansas City the registration list showed about 350 names.

The Texas hotel had received reservations for 200 rooms up to Feb. 15 and additional reservations are being received daily. Officers of the association are suggesting to members and visitors expecting to be present that they be sure to make advance reservations to avoid a last minute scramble for rooms.

To care for the large Tulsa delegation of refinery executives, plant superintendents, sales, credit and traffic managers, the Frisco railroad has scheduled a special train to Fort Worth on the night of March 1. The train will leave Tulsa an hour later than the regular train and make no stops, arriving at Fort Worth early the next morning.

The Illinois Central is arranging for special cars out of Chicago to St. Louis to be transferred there to the Frisco. It is reported that one Pullman has been filled thus far and that a second probably will be required.

The chief feature on the entertainment program for refiners will be a barbecue provided by the business interests of Fort Worth.

F. A. Pielsticker vice-president Skelly Oil Co. and president Western Petroleum Refiners Association.

The barbecue will be followed by a number of boxing bouts and vaudeville acts especially arranged. Complete details of the evening will not be announced until the convention opens. The barbecue will be on the evening of March 2.

Ladies will be entertained at a theatre party while the barbecue is in progress. During business sessions on Wednesday the ladies will be entertained at the Fort Worth club with a luncheon and bridge party.

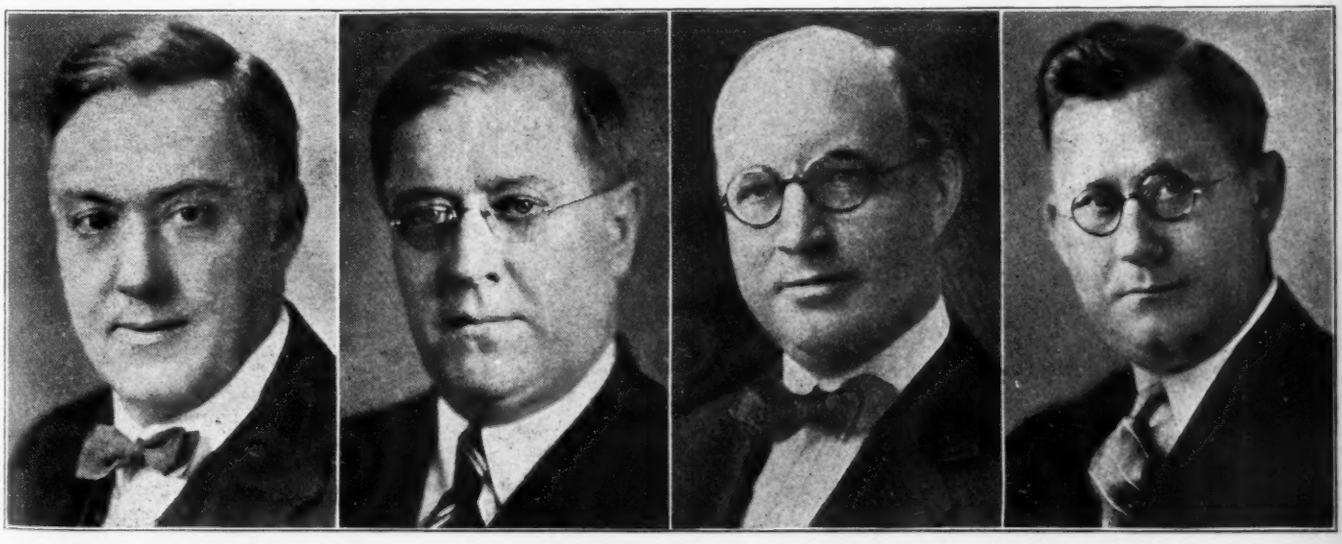
Ladies will be expected to accompany their escorts to the annual banquet on the evening of March 3 at the Texas hotel. R. L. Welch, secretary of the American Petroleum Institute and formerly secretary of the refiners association, will act as toastmaster at the banquet. Sidney Samuels a well known after dinner speaker has been obtained to make an address. D. W. Moffitt, vice president of the Mid-Continent Petroleum Corp. (Cosden), will speak on the subject, "Past and Present," which ought to give ample latitude even though the future was left out.

Traffic Managers' Session

Following registration of members and visitors on the morning of the opening day a special meeting of traffic managers will be held in the Cactus room beginning at 10 o'clock. R. R. Irwin, vice president of the White Eagle Oil & Refining Co., will preside. Fayette B. Dow, Washington counsel for the association will speak on Docket 17,000 and the present rate and transportation situation throughout the country, giving special emphasis to problems of the Mid-Continent.

H. C. Mulroy, vice president of the Marland Refining Co., who billed out the first car of gasoline for the Marland plant nine years ago and has watched the tremendous growth of the refining industry in the southwest, will speak on "Traffic and its Place in the Industry." The remainder of the morning will be taken up with discussion of general traffic problems.

The first general meeting of the asso-



Left to right, George D. Locke, vice-president, Barnsdall Refining Co., and vice-president Western Petroleum Refiners Association; P. M. Miskell manager Empire Refineries Inc., and vice-president Western Petroleum Refiners Association; Roy B. Jones, president Panhandle Refining Co. and vice-president W. P. R. A.; Howard Bennette managing director, W. P. R. A.

ciation will open at 1:30 p. m. in the Crystal ball room with President F. A. Pielsticker presiding. After the President's annual address Mr. Dow will make his report.

The first afternoon will be closed with a session of the sales and credit managers at which vice president George D. Locke, Barnsdall Refining Co., will preside. R. R. Irwin will speak on the "Wholesale Selling of Oils," to open the discussion of that subject. A. B. Eisenhower, vice president of the Commerce Trust Co., Kansas City, an expert on credits, will speak on that subject preliminary to an open discussion.

Technical Meeting

C. L. Henderson, vice president of the Vickers Petroleum Co., Wichita, who is chairman of the manufacturing committee of the association, will preside at the technical sessions which open at 9:30 on Wednesday morning.

Ludwig Schmidt, petroleum engineer of the Bureau of Mines from the Bartlesville station, will read a paper on "Decreasing Refinery Evaporation Losses of Gasoline." Mr. Schmidt has recently completed an intensive study of methods employed to decrease losses at refineries. The address will be followed by a general discussion.

Isaiah Hale, safety supervisor for the Santa Fe railroad, will speak on "The Mind as a Factor in Industrial Accidents." Mr. Hale is a pioneer in accident prevention work.

Dr. A. P. Bjerregaard, petroleum technogolist for the Empire Refineries, Inc., has prepared a paper for presentation on "Specifications of Petroleum Products." Following his paper a buffet luncheon will be served and the session will be continued with a paper by Dr. C. K. Francis on "Contributing Factors to Corrosion with Special Reference to Sulphur."

"What Domestic and Industrial Oil Burning Mean to the Refiner," will be discussed by Edward P. Bailey, formerly president of the American Oil Burner Association. The afternoon will be closed with a paper on insulation prepared by L. E. Cover, insulation engineer for the Armstrong Cork & Insulation Co.

The last day of the convention will be opened with breakfast Thursday morning after which Harry H. Smith, secretary of the Mid-Continent Oil & Gas Association will speak on "Taxes as a Cost of Doing Business." This will be followed by the annual business meeting and election of officers.

P. M. Miskell, general manager of the Empire Refineries, Inc., is being prominently mentioned by refinery executives for president of the association for the coming year. Mr. Miskell has been vice president of the association for a number of years and is intimately acquainted with the problems of the organization. Mr. Pielsticker has served the organization for two years and will not accept re-election for a third term.

Gasoline Products Co. Wins Suit For Cracking Royalties

NEW YORK, Feb. 17.—The Gasoline Products Co. has been awarded a judgment of about $33,000 against the American Refining Co. of Wichita Falls, Tex. The statement of the Gasoline Products Co. concerning the case follows:

"On June 1, 1923, the American Refining Co. entered into a contract with Gasoline Products Co., Inc., under which the American Refining Co. was licensed to practice the Cross cracking process upon payment of a royalty of 10 cents per barrel.

"The American Refining Co. constructed two units of the Cross cracking process, which were placed in operation in January, 1924.

"Royalties were paid under the contract for four months and in June, 1924, the Gasoline Products Co. was named as one of the primary defendants and the American Refining Co. as one of the secondary defendants in a suit brought by the United States Government in which one of the allegations was to the effect that the contract by which Gasoline Products Co. had secured immunity under the patents of The Texas Co., Standard Oil Co. of Indiana, and Standard Oil Co. of New Jersey for itself and its licensees in the practice of the Cross process, was in violation of the Sherman anti-trust act.

"The American Refining Co. asserted that it was warranted in withholding all payment of royalties to the Gasoline Products Co. until such time as a decree should be entered in the government suit, and, therefore, ceased payment of royalties. Gasoline Products Co., after giving the 60 days' notice provided therein, cancelled the license contract, such cancellation being effective Dec. 9, 1924.

"Gasoline Products Co. thereupon filed suit for the collection of royalties due under the contract from the date of last payment to Dec. 9th, 1924.

"The American Refining Co. set up as part of its defense the pendency of the government suit but, upon motion, that portion of the answer was stricken out by the court. The American Refining Co. then further amended its answer and alleged that certain contracts had been entered into by Gasoline Products Co. after the date of the American Refining Co. license providing a lower rate of royalty than 10 cents per barrel which would, in accordance with the terms of that license contract, entitle the American Refining Co. to a lower rate of royalty.

"Upon trial, the testimony adduced did not support this allegation and the attorneys for the American Refining Co. withdrew that portion of their amended answer and judgment was rendered by Judge P. A. Martin in the 89th Judicial District Court of Wichita County, Texas, on Jan. 25, 1926, in favor of the Gasoline Products Co. for the amount sued for, approximately $33,000.

"The American Refining Co. has continued to practice the Cross process and the Gasoline Products Co. has filed suit in the United States District Court for the District of Delaware, alleging that such operation is an infringement of its patents and asking a permanent injunction against such operation and damages in such sum as the court may allow.

"The American Refining Co. in its answer admitted the infringing operation and attacked the validity of the patents; also setting up certain allegations in regard to the pendency of the government suit which, upon motion, were sticken out, the court holding that such allegations were collateral to the issues involved. It is expected that this case will be set for early trial."

Special Cars to W. P. R. A. Meet in Fort Worth

Staff Special

CHICAGO, Feb. 19.—W. G. Ferstel, district passenger agent of the Illinois Central System, 208 South La Salle Street, Chicago, has announced officially that his company will operate a special service for oil men in this section who wish to attend the meeting of the Western Petroleum Refiners' Association in Fort Worth, Tex., on March 2, 3 and 4 in the Texas Hotel.

Using this service the oil men may leave Chicago (Central Station at the south end of Grant Park) at 11:45 o'clock a.m. on Feb. 28, via. I. C., and arrive in St. Louis the same date at 6:15 p.m. From St Louis the trip will be made over the Frisco lines, leaving at 6:50 p.m., Feb. 28 and arriving in Fort Worth at 1:30 p.m., March 1. The whole rail trip will consume 25 hours and 45 minutes with 35 minutes in St. Louis.

John M. Carson, Cosden Sales Corp., George D. Locke, Barnsdall Refining Co., and other prominent Chicago oil men are sponsering the train.

Prepare for Chemists

TULSA, Feb. 20.—Preparations are being made by Tulsa members of the American Chemical Society to entertain the annual convention of that oganization here April 5 to 9. The Chamber of Commerce is aiding the general chairman, Dr. C. K. Francis, and E. F. McIntyre, chairman of the entertainment committee.

Crude Production by Districts

Daily average gross crude output of United States, by fields, for week ending with dates given below, as compiled by American Petroleum Institute

National Petroleum News

OKLAHOMA

	Feb. 20.	Feb. 13.
North Braman	2,150	2,700
South Braman	8,350	7,950
Blackwell	3,350	3,400
Hubbard	2,150	2,200
Thomas	9,350	10,200
Tonkawa	41,950	42,350
Garber	26,600	27,200
Burbank	44,750	44,850
Osage, outside Burbank	33,000	33,150
Watchorn	2,850	2,900
Cushing	22,500	22,600
Yale Jennings	11,450	11,350
Davenport	21,800	19,850
Bristow-Slick	31,950	32,150
North Okmulgee	18,500	18,550
Lyons-Deaner	4,300	4,300
Stroud	2,850	2,700
Cromwell	19,600	20,050
Papoose	15,100	15,350
Wewoka	15,750	14,100
Duncan district	7,500	7,500
Graham	9,200	9,250
Fox	3,600	3,500
Healdton	15,000	14,950
Hewitt	12,500	12,600
Others	63,900	63,300
Total Oklahoma	450,000	449,000
Increase		1,000

KANSAS

	Feb. 20.	Feb. 13.
Florence-Covert	1,900	2,000
Peabody-Elbing	4,850	4,950
Eldorado-Towanda	14,150	14,300
Augusta-Fox-Bush	5,050	5,000
Rainbow Bend	4,850	5,050
Russell	5,100	5,400
Others	25,550	64,550
Total Kansas	102,600	101,250
Increase		1,350

NORTH LOUISIANA

	Feb. 20.	Feb. 13.
Homer	5,850	5,900
Haynesville	10,350	10,400
Caddo, light	8,850	8,850
Caddo, heavy	2,250	2,350
De Soto, Red River	3,950	3,900
Elm Grove	600	550
Bellevue	2,350	2,350
Cotton Valley	8,100	8,150
Urania	2,300	950
Total North Louisiana	44,600	43,400
Increase		1,200

ARKANSAS

El Dorado	7,550	7,600
Smackover, light	18,850	19,200
Smackover, heavy	140,400	140,200
Stephens	1,500	1,500
Nevada	1,600	1,600
Total Arkansas	169,900	170,150
Decrease		250

NORTH TEXAS

Burkburnett	12,300	12,400
Electra	16,150	16,350
Iowa Park and K-M-A	5,450	5,400
Wilbarger	12,150	11,400
Panhandle	3,050	3,100
Petrolia	450	400
Archer County	26,200	26,900
Others		900
Total North Texas	76,650	76,850
Decrease		200

EAST CENTRAL TEXAS

Mexia	13,150	13,250
Currie	1,050	1,050
Richland	2,300	2,500
Corsicana-Powell	32,200	32,100
Wortham	10,500	10,950
Total East Central Texas	59,200	59,850
Decrease		650

WEST CENTRAL TEXAS

	Feb. 20	Feb. 13
Stephens County	12,750	12,650
Eastland County	5,900	5,850
Desdemona	2,050	2,050
Young county	7,950	7,850
Palo Pinto County	400	400
Callahan County	4,450	4,450
Shackelford County	2,300	2,300
Reagan County	28,700	29,300
Others	5,100	5,050
Total West Central Texas	69,600	69,900
Decrease		300

SOUTHWEST TEXAS

Luling	21,200	20,850
Mirando	5,600	5,600
Somerset	2,250	2,200
Lytton Springs	7,150	7,050
Fiedras Pintas	700	
Others	750	1,300
Total Southwest Texas	37,650	37,000
Increase		650

GULF COAST

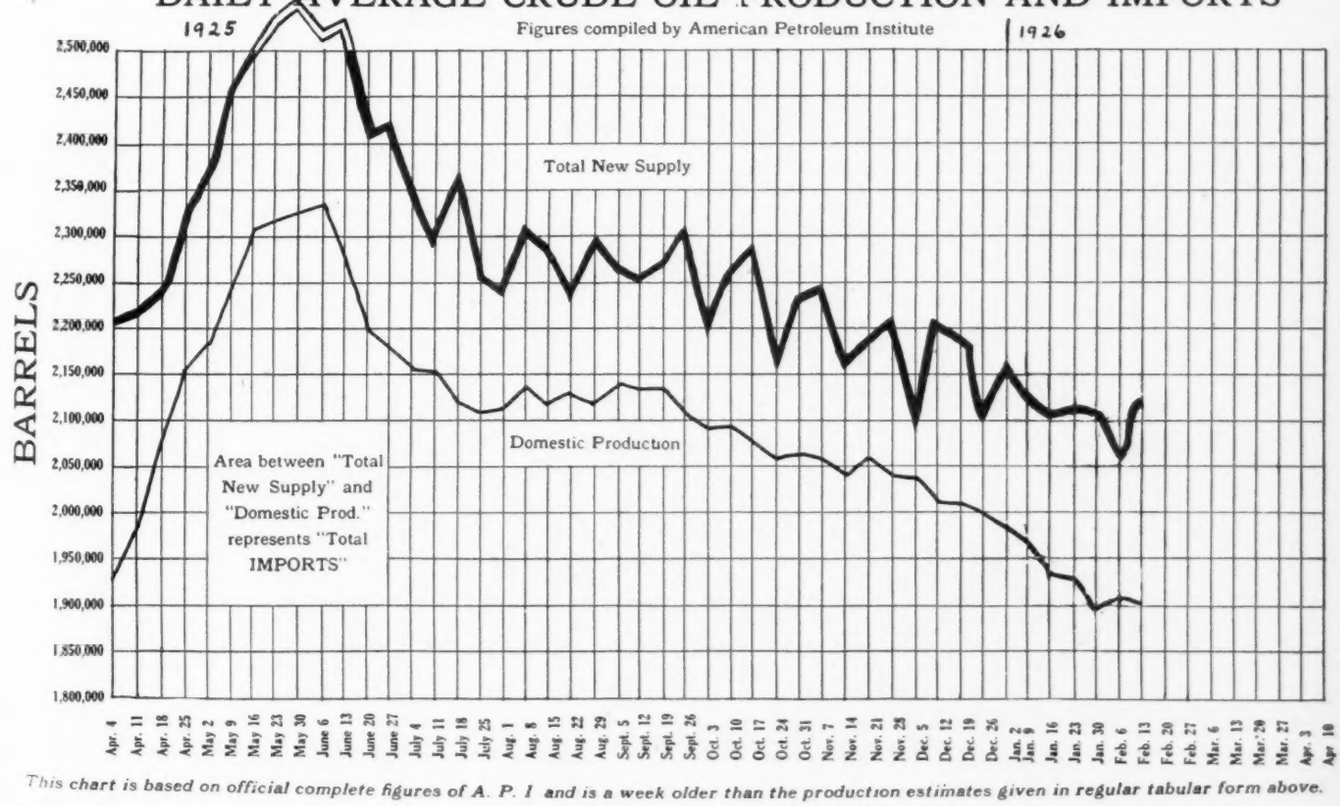
Goose Creek	8,550	8,500
Hull	15,250	15,450
Saratoga	1,250	1,250
Blue Ridge	900	900
Damon Mound	1,000	1,000
Batson	1,150	1,100
West Columbia	9,150	9,000
Humble	4,900	4,750
Pierce Junction	1,300	1,300
Sour Lake	4,800	4,800
Spindletop	4,150	5,350
Orange County	13,600	13,300
Edgerly	600	600
Evangeline	1,050	1,050
Vinton	6,600	6,500
Lockport	1,600	1,550
South Liberty	7,700	7,750
Big Creek	1,000	950
Boling	3,950	4,250
Others	3,950	1,600
Total Gulf Coast	90,100	90,950
Decrease		850

ROCKY MOUNTAIN

	Feb. 20	Feb. 13
WYOMING		
Salt Creek	53,950	55,350
Grass Creek	2,750	2,800
Elk Basin	550	650
Big Muddy	3,350	3,400
Lost Soldier	4,200	4,150
Rock River	2,750	2,950
Teapot Dome	1,700	1,700

DAILY AVERAGE CRUDE OIL PRODUCTION AND IMPORTS

Figures compiled by American Petroleum Institute



This chart is based on official complete figures of A. P. I and is a week older than the production estimates given in regular tabular form above.

Others	4,550	4,350
Total Wyoming	73,800	75,350
Decrease		1,550

MONTANA

	Feb. 20	Feb. 13
Cat Creek	3,050	3,100
Sunburst	11,650	9,050
Total Montana	14,700	12,150
Increase		2,550

COLORADO

Moffat (Craig)	3,800	3,750
Fort Collins	2,450	2,400
Florence	400	400
Others	500	450
Total Colorado	7,150	7,000
Increase		150

NEW MEXICO

Artesia	3,400	3,200
Hogback	500	550
Rattlesnake	400	400
Total New Mexico	4,300	4,150
Increase		150
Total Rocky Mountain	99,950	98,650
Increase		1,300

CALIFORNIA

Santa Fe Springs	48,000	47,000
Long Beach	111,000	112,500
Huntington Beach	44,500	44,500
Dominguez	23,000	23,000
Torrance	28,000	28,500
Rosecrans	22,000	22,000
Inglewood	55,000	56,000
Midway-Sunset	92,000	92,000
Others	180,000	181,000
Total California	603,500	606,500
Decrease		3,000

EASTERN

(Including Ill., Ind., Ky., Ohio, W. Va., Pa. and N. Y.)	99,000	99,000

Production Summary

Production east of Rockies	1,299,250	1,296,000
Increase		3,250
Total Production in U. S.	1,902,750	1,902,500
Increase		250

Late Tank Wagon Change

NEW YORK, Feb. 23.—On Feb. 23 Standard Oil Co. of New Jersey advanced tank wagon and service station prices of gasoline 1 cent in Virginia, North and South Carolina, and ½ cent in West Virginia. Tank wagon prices in the three four states were brought to 17 cents generally, and in West Virginia to 16.5 cents, not including state taxes.

Texas Panhandle Crude Raised

TULSA, Feb. 20.—It was announced on Feb. 17 that Kay County Oil & Gas Co. (Marland interests) had advanced on Feb. 12 the price of Texas Panhandle crude from 10 to 20 cents, effective Feb. 1. New prices range from $1.15 to $1.75 per barrel. This crude is in the vicinity of the new Amarillo field.

Columbia Refining to Have Party

CLEVELAND, Feb. 23.—A dancing party will be given by the Columbia Refining Co., with headquarters here, at the Woman's Club on the evening of Feb. 27, according to Burt Zimmerman, general manager. Cards are on the program for those who prefer this form of amusement.

Lyons Head of Mutual Insurance Company

PHILADELPHIA, Feb. 20.—E. M. Lyons, of the Tiona Refining Co., Philadelphia and Clarendon, Pa., was elected president of the National Petroleum Mutual Fire Insurance Co. at the annual meeting of the Board of Directors here Feb. 18, to succeed Harry H. Willock. Mr. Willock in selling his interest in the Waverly Oil works Company of Pittsburgh, is getting out of the oil business and asked that his resignation be accepted.

Mr. Willock was president of the National Petroleum Mutual since it was organized in 1910. He saw it grow from handling insurance for only the western Pennsylvania refiners until today it has insurance on oil plants, big and little, all over the United States amounting at the end of 1925 to some $24,000,000.

Mr. Lyons has been a director and member of the executive committee of the insurance company for a great many years and for some years vice-president. Sam Messer, of Jas. B. Berry's Sons Co., Oil City, was elected vice-president and C. E. Townsend of the Sun Co., Philadelphia, was put on the executive committee to succeed Mr. Lyons.

Augustus J. Loos, one of the veteran members of the company and a director died in January, after many months of failing health. He was with the old lubricating firm of Loos & Dilworth, Philadelphia. To succeed Mr. Loos on the board and executive committee Henry H. Pease, vice president of the Lehigh Coal & Navigation Co., Philadelphia, was elected. Messrs. Townsend and Pease, together with E. S. Newhold, Welsbach St., Ill. Co., Philadelphia, constitute the executive committee.

Houston Dunn, secretary and treasurer of the company, reported a prosperous year, even though there were a number of fires and some large losses. The company showed a good increase in volume of business and in number of members.

Cross Buys Rights To John C. Black Patents

Staff Special

NEW YORK, Feb. 20.—Another step toward defining the patent situation in the field of cracking oil by heat and pressure was made recently when the Gasoline Products Co., owners of the Cross cracking process, bought the rights of John C. Black, inventor of the Black cracking process, in his patents.

The statement of the Gasoline Products Co. concerning the deal, follows:

"Gasoline Products Co. announces that it has purchased all inventions of John C. Black, relating to cracking conceived prior to Dec. 1, 1925, and all issued patents and applications pending or that may be filed thereon. Such purchase was made subject to certain existing licenses under the Black patents to the Pan American Petroleum Co., Pan American Petroleum & Transport Co. and the Standard Oil Co. of California, the vendors reserving the right to any royalties paid by such licensees, which, of course, acquired no rights under the Cross patents.

"Gasoline Products Co. shortly after acquiring the Black inventions and patents granted licenses thereunder to all of its existing licensees without increasing the royalty rates already in force.

"While Gasoline Products Co. is paying a substantial price for the Black inventions and patents, its present policy will be to include in its licenses of the Cross process immunity under the Black patents, as well as under the Lewis patents and the patents of the Standard Oil Co. (Indiana), Standard Oil Co. (New Jersey) and The Texas Co. It will also embody in the plans and specifications furnished to its licensees, such improvements disclosed by the Black patents as may increase the economy and utility of the Cross process as from time to time developed."

Mobile Jobber President of Southern Group

Staff Special

ATLANTA, Feb. 20.—Nearly 70 oil jobbers from scattered points in Alabama and Georgia gathered here in the Ansley Hotel on Feb. 15 and 16 for the purpose of organizing a sectional association of southern oil men. The first intention was to form an organization to include jobbers of three states, Alabama, Georgia and Florida. It happened though that no Florida jobbers were present so the organization has been called the Georgia-Alabama Independent Petroleum Marketers Association.

The major portion of the time spent in business session was used in adopting a constitution and by-laws. Near the close of the meeting the following officers were chosen in addition to a board of directors.

J. W. Handley, Palm Oil & Supply Co., Mobile, Ala., was elected president. R. N. Reed, Reed Oil Corp., Atlanta, for many years the leading spirit in a former association of southern jobbers, became first vice president. Clayton Boardman, Peoples Oil Co., Augusta, Ga., the eldest of three brothers now active in running the business established by their father in 1904, was named second vice president. J. C. Robertson, Woco Oil Co., Tuscaloosa, Ala., became third vice president.

W. L. "Dixie" Moore, Wofford Oil Co. of Georgia, with headquarters in Atlanta, was named secretary and treasurer. Mr. Moore is one of the best known oil men among the Independents in the south. He was secretary of the former organization of southern jobbers, helped to organize the Carolina group and has personally solicited memberships and sold lubricating oils to a good portion of the Independents in the southeastern quarter of the country.

H. H. Willock Retires as Waverly And Pittsburgh Plants Merge

By Roger B. Stafford
N. P. N. STAFF WRITER

CLEVELAND, Feb. 20

HARRY H. WILLOCK, one of the most widely known men in the oil business, has sold his interest in the Waverly Oil Works Co. of Pittsburgh and is retiring from the petroleum industry after serving it 39 years. His cousin, D. E. Weir, who has been with the Waverly Company for 43 or 44 years and its president for many years, also has sold out and is retiring.

Announcement of the retirement of these Waverly veterans came with another announcement that the Waverly company and the Pittsburgh Oil & Refining Co. had consolidated. The Waverly name will be retained by the consolidated corporation which has been chartered in Pennsylvania.

Thomas J. Hilliard, who has been president of the Pittsburgh Oil & Refining Co., will be president of the new Waverly Oil Works Co.

With Mr. Hilliard will be associated as directors of the new Waverly company George J. Willock, vice-president of the old Waverly and brother of Harry; C. Dudley Armstrong, vice-president of the Armstrong Cork Co.; H. R. Hilliard, brother of Thomas J. and head of the bond department of the Mellon National bank, Pittsburgh, and S. M. Vockel, S. M. Vockel & Co., investment bankers of Pittsburgh

Officers of New Waverly

Officers of the consolidated company are: Thomas J. Hilliard, president; H. R. Hilliard, vice-president and treasurer; D. W. Hovey, vice-president in charge of plant operations, and S. M. Hamilton, secretary and assistant treasurer. The active management will be in the hands of T. J. Hilliard, G. J. Willock and Mr. Hovey. It was announced there would be no change in the operating and distributing policies of the merged enterprise, the Waverly plant will continue to refine Pennsylvania crude and the Pittsburgh plant, Kentucky crude.

The capital structure of the new company is made up of 40,000 shares of no par cumulative preferential and participating common A stock to carry $3 per share dividend per year, all issued, and 40,000 shares of common B stock, 30,000 issued. The A stock, non-voting, has been offered the public at $42 a share. The B stock, voting, is closely held by the directors.

The business of the Waverly was established in 1880 by S. M. Willock, father of Harry and George. After the death of the father in 1908 the enterprise

Harry H. Willock

was incorporated as the Waverly Oil Works Co. The company has a complete refinery, specializing in lubricating oils and greases, situated on a five-acre site at 54th St. and the Allegheny Valley railroad in Pittsburgh. It has a charging capacity of 27,000 barrels of crude per month. Pennsylvania crude is used exclusively.

The Pittsburgh Plant

The Pittsburgh Oil & Refining Co. was organized in January, 1923, to take over the properties of the Pittsburgh Oil Refining Corp. at Coraopolis, Pa. At that time the capacity of the plant was 25,000 barrels per month. It has since been enlarged and improved, and has been charging to stills around 70,000 barrels of crude per month lately, T. J. Hilliard said.

Waverly distributes its lubes and specialities nationally through jobbers but has built up in the greater Pittsburgh district a large dealer organization for the handling of its light ends. The Pittsburgh company has distributed its products—gasoline, naphtha, kerosene and several grades of fuel oil to the wholesale trade only. Under the new arrangement, according to T. J. Hilliard, the company will be able to dispose of a large part of its gasoline to the retail trade at increased profit. Waverly also is interested in an export depot at Carteret, N. J.

The net or depreciated value put on the plant of the Waverly is $1,244,142 and on the Pittsburgh plant $659,733. The consolidated balance sheet based on those appraisal values, shows net tangible assets of $2,474,281, giving the A stock a book value of $61.75 a share.

Its net current assets were $986,320 after giving effect to the consolidation. The balance sheet shows:

Assets

Cash	$ 100,744
Trade acceptances, notes	10,450
Acc'ts receivable, net	413,200
Inventory	696,288
Miscellaneous current assets	18,539
Investments	101,638
Plant, equipment, tank cars, less depreciation	1,903,876
Trade mark	5
Deferred charges	20,480
Total	$3,265,220

Liabilities

Notes payable	$ 245,000
Accounts payable	94,337
Accrued expenses	15,202
Mortgage loans	417,500
Federal tax reserve	23,900
Capital, surplus undivided profits	2,474,281
Total	$3,265,220

Net earnings of the Waverly during the last 10 years have averaged $235,124 a year on an outstanding capital of $600,000. The Pittsburgh company profited on its operations in 1924 and 1925 but failed to show a profit in 1923, the year it was organized. The consolidation is expected to effect a saving of $140,000 a year eventually, Mr. Hilliard said.

The Pittsburgh company has had offices in the Oliver Bldg., Pittsburgh, but expects later to move to the Waverly plant where the old Waverly company had its offices. A plant office for the Pittsburgh Oil Refining division will be maintained at Coraopolis.

Willock's Other Interests

After his usual March vacation, Harry Willock said he would devote his time to his other interests in Pittsburgh. For years he has been getting down to his office about 6:30 to 7 o'clock each morning and leaving at noon.

"The early morning is the best time of the day to work," he explained and the arrangement gave him the entire afternoon to devote to other business or recreation. His market letters issued at the first of each month have become a tradition in the industry for their frankness in sizing up the crude or tank wagon markets. The "Waverly Handbook" which he fostered, is a volume containing information invaluable to the refiner, compounder and marketer.

Mr. Willock has always been prominent at gatherings of eastern refiners and said he expected to continue to visit those gatherings, thus maintaining his contact with the eastern refining industry which he could not easily divorce after 39 years' association with it.

Lommel Chosen President Of Iowa Oil Jobbers

Staff Special

DES MOINES, Feb. 20.—The annual convention of the Iowa Independent Oil Men's Association was held at the Hotel Fort Des Moines on Feb. 9 and 10. Jobbers who attended the meeting described it as the most successful in the history of the organization.

The election of officers which took place on the second day of the meeting resulted in choosing A. L. Lommel, Bartles-Shepherd Oil Co., Waterloo, president. H. E. Wormhoudt, Manhattan Oil Co, Des Moines, the former presiding officer, was made first vice president, J. M. Conover, Tri-State Oil Co., of Calmar, became second vice president, and H. G. Sharfenberg, Community Service Stations Co., Fort Dodge, third vice president. J. M. Cushman, International Oil Co., Des Moines, was elected treasurer and M. L. Long was selected to continue as secretary.

The business sessions of the convention did not begin until Tuesday afternoon, after registration had finished. Mr. Wormhoudt presided. At the last annual meeting here in 1925 Mr. Wormhoudt was elected first vice president under L. F. Kuehnle, Leader Oil Co. of Dubuque as president. During the past year Mr Kuehnle's health became bad and the duties of the executive chair all devolved upon Mr. Wormhoudt. He delivered the opening address and, toward the last of it outlined the convention plans. His idea of devoting most of the business sessions to open forum discussions of matters important to Iowa Jobbers worked out with remarkable success. Secretary Long reports that the oil men were ready and responsive in all discussions and that their comments were quite enlightening.

The address of welcome Tuesday afternoon was delivered by J. C. Hamilton, secretary of the Des Moines convention bureau, and it was responded to by Mr. Conover who enjoys the distinction of being the Iowa association's favorite orator.

Among the practical matters discussed were Credits and Collections; Handling of Agents and Tank Wagon Men; Oil Burners and Fuel Oil, and Quantity Discount Agreements as Handled in Iowa. The report that the Advance-Rumely Tractor Co. is manufacturing and selling its own lubricating oils also was brought up on the floor and discussed thoroughly. In the meantime the good work of the association over the past year came in for a share of commendation.

The chief speakers of the convention were H. C. Wurster, Hawkeye Oil Co., Waterloo; Tom E. Meece, Leader Oil Co., Dubuque; E. Rizk, Interstate Oil Co., Sioux City; Mr. Conover and Mr. Sharfenberg.

Those who took active part in the discussions and demonstrated special interest in matters of mutual concern included William Toole, Lincoln Oil Co., Boone; G. B. Schaler, Best Oil & Refining Co., Cedar Rapids; S. C. Pulis, Bacter Oil Co., Baxter; C. G. Gray of Charles City; J. T. Dettner, Black Hawk Oil Co., Waterloo; Pat Purman, Big Four Oil & Grease Co., Sheldon; C. M. Glass, Mason City Oil & Grease Co., Mason City; Homer Coppock, Farmers Oil Co., Shenandoah, Fred Crawford, Highway Oil Co., Mason City, and others.

Monarch Manufacturing Co. of Council Bluffs, headed by H. A. Searle, Sr., was represented at the meeting and extended an invitation to the Iowa association to use its radio broadcasting station K. O. I. L. at any time its use would help the association or its members as a group. The story of K. O. I. L. was told in last Nov. 18 issue of National Petroleum News.

The evening of Feb. 9 was the time set for the frolic. The banquet started at 6 o'clock p. m. and music and entertainment were furnished by "Dutch" Schmidt and his famous troupe of entertainers. The annual dance followed the banquet. In addition to the banquet, varied entertainment was provided for the ladies of the Iowa jobbers who came to the meeting. Their pleasures were planned and carried out by Mesdames J. M. Cushman, H. E. Wormhoudt and M. L. Long.

The business meeting, where officers and directors were chosen took place in the afternoon of the last day of the convention. The directors are L. F. Kuehnle, Leader Oil Co., Dubuque; R. D. Seeley, Mason City Oil & Grease Co., Mason City; H. E. Woodward, Lincoln Oil Co., Boone; G. S. Speaker, Cities Service Oil Co., Cedar Rapids; Ben Gerwe, Davenport Oil & Supply Co., Davenport; H. C. Meier, Penn-Consumers Oil Co., Council Bluffs; C. C. Johnston, Johnston Oil Co., Eldon; J. L. Collins, S. L. Collins Oil Co., Knoxville, Ia.; Mr. Crawford of Mason City, Mr. Wurster of Waterloo and Mr. Rizk of Sioux City.

Panhandle and Crockett County Deals Made

FORT WORTH, Feb. 19.—Two deals involving extensive property transfers in different parts of West Texas have been announced here. Phillips Petroleum Co. exercised its option to purchase 400 acres of leaseholds and one well in the Panhandle territory from the South Hutchinson Oil Co., for $400,000 cash and $600,000 to be paid out of oil, when, if and as produced. The Texas Co. acquired the J. C. Cooke et al Crockett county well in sec. 50, about 12 miles southwest of the World pool, and 1870 acres of leaseholds, subject to fulfillment of title requirements, etc., for a reported $200,000 in cash and $400,000 out of oil when, if and as produced.

The Cooke well came in as a gasser and wrecked the derrick about two weeks ago; making oil along with the gas flow when the rig had been rebuilt. Located on the J. S. Todd ranch, it is between 1700 and 1800 feet deep.

Phillips Petroleum Co.'s acquisition in the Panhandle, coupled with its recently closed contract for development of Gibson Oil Co. acreage in the southern part of Hutchinson county, will make this Bartlesville interest one of the most active operators in the Amarillo district.

Operating and Closed Refineries in Bureau of Mines Groupings

Staff Special

TULSA, Feb. 23.—From the new census of petroleum refineries of the United States as of Jan. 1, prepared by the U. S. Bureau of Mines, H. K. Davis, statistician of the Western Petroleum Refiners Association, has worked out a table showing the number of plants and capacities open and shut down in groups corresponding with the groupings used by the bureau in making monthly reports on crude runs and production and stocks of finished products. The table follows:

	Number of Refineries				Capacities of Refineries			
	Bldg.	S.D.	Op.	Total	Bldg.	S.D.	Op.	Total
East Coast	.	2	21	23	.....	6,200	476,000	482,200
Appalachian	.	7	64	71	.....	2,580	96,170	98,750
Indiana-Illinois, etc.	.	14	27	41	.....	12,200	202,000	214,200
Oklahoma-Kansas, etc.	.	45	70	115	.....	106,350	345,600	451,950
Inland Texas	.	37	45	82	.....	77,330	138,100	215,430
Inland Louisiana-Arkansas	.	11	17	28	.....	11,450	64,220	75,670
Texas Gulf Coast	.	3	15	18	.....	9,500	329,800	339,300
Louisiana Gulf Coast	.	1	6	7	.....	10,000	122,500	132,500
Rocky Mountain	1	10	31	42	500	8,150	147,917	156,567
California	1	28	56	85	5,000	46,850	669,050	720,900
United States Total	2	158	352	512	5,500	290,610	2,591,357	2,887,467
Mid-Continent Total	.	93	132	225	.....	195,130	547,920	743,050
Gulf Coast Total	.	4	21	25	.....	19,500	452,300	471,800

Third Billion-Barrel Year is Record Of the World in 1925

By Lawrence E. Smith
N. P. N. Staff Writer

NEW YORK, Feb. 22.

ALONG with the appraisal of the oil production in the United States, its past year's history and its outlook for the present year, petroleum division members of the A. I. M. E. took a careful look at the world situation.

The platform from which the looking was done has in past years been the scene of some notable predictions—notable because they later became actuality. In 1922, for example, attention was called to an impending break in the high tide of Mexican production. The following year emphasis was placed, in February, on what might be expected of California. Last year a fairly close estimate was made of what was to come during the year in territory tributary to the United States—Mexico, South America.

This year several speakers presented their views on various parts of the oil producing world. They were geologists and engineers closely familiar with the fields and districts they discussed.

E. L. DeGolyer, president of the Amerada Petroleum Corp., geologist, close student of the world of petroleum, presented an outline of world development of petroleum in 1925. He gave at the same time an estimate of total production for 1925. Later, the Bureau of Mines will publish final figures. Mr. DeGolyer made the same kind of estimate last year for 1924 and his figures were within thirty-one hundredths of one per cent of agreement with the U. S. final figures.

Again, the Favorable Outlook

Quoting from Mr. DeGolyer as to the outlook:

"The outlook for the present is the same as the outlook at this time of year in 1925, and in 1924; for decline in production and withdrawal of oil from storage. As in previous years, no pool of bonanza proportions is in sight. Our expectations have failed of realization before and may fail again. Each year we seem to find our hopes defeated by some new and potent factor which we have not met before.

"Last year, for example, the industry learned by experiment that it could suffer from over-refining at a time when production conditions were fairly satisfactory. Caution suggests that after considering factors with which we have had experience, time may well be spent in considering the possible results of still newer influences which we have not yet experienced.

Gasoline and Fuel Oil

"One such factor .... is the possibility that in times of consumption in excess of production, certain users of fuel oil in competition with coal must yield to gasoline users on account of price increase. If Teagle's law, as outlined at Fort Worth, is true and, in times of continued over-production, the price of gasoline must be determined by the price at which fuel oil can be profitably cracked and so by the price of fuel oil, the converse must also be true and in times of continued under-production, the price of fuel oil must be governed to some extent by the price of gasoline. In other words, according to modern refining practice, fuel oil is largely potential gasoline, at a price. The gasoline market is the price control in time of gasoline shortage and the fuel oil market is the price control in time of an oversupply of gasoline. If one may follow the leaders of the industry, the use of fuel oil in competition with coal is, to say the least, uneconomic and in the case of gasoline shortage, such user of fuel oil must yield to the requirements of the gasoline user. Price is the club which makes him yield.

"Teagle estimates that approximately 1,054,000 barrels daily of our present consumption is oil burned under boilers in competition with coal. Granting that there are preferred uses such as bunkering, there must be a great quantity of this oil the use of which is entirely in competition with coal.

Around the Circle

"The point which the writer would suggest is that when the time comes to take over any appreciable fraction of this oil for cracking purposes, it can be done only by price increase and, again following Teagle, the critical fraction which establishes the price is approximately 10 per cent. Will this not drive the oil-in-competition-with-coal user from the fuel oil market and throw back into the industry a much greater quantity of oil than it can crack and market as gasoline? Any such readjustment of oil consumption must result in price disturbances."

Production the world around: Passed, for the third successive year, the billion barrel mark. A new peak reached in 1925 was 1,066,208,894 barrels, an increase of 53,281,894 barrels, or 5.2 per cent over 1924, Mr. DeGolyer's estimates show. The previous peak year was 1923.

Summary: "Production in the United States increased approximately 50,000,000 barrels to a new peak. Venezuelan production increased some 11,000,000 barrels and Russian Roumania, Persia, Argentina and Peru showed substantial and satisfactory increases. Mexican production decreased about 25,000,000 barrels.

"Production of foreign countries during 1925 was generally according to expectations as expressed at this time last year. Production in the United States exceeded expectations and consumption, satisfactory as it was, did not meet expectations. The net result was an increase in stocks instead of the indicated draught. On the whole, however, overproduction was confined fairly well to low gravity Smackover crude and to California and the year was a prosperous and satisfactory one in the industry—by far the best it has experienced since 1920."

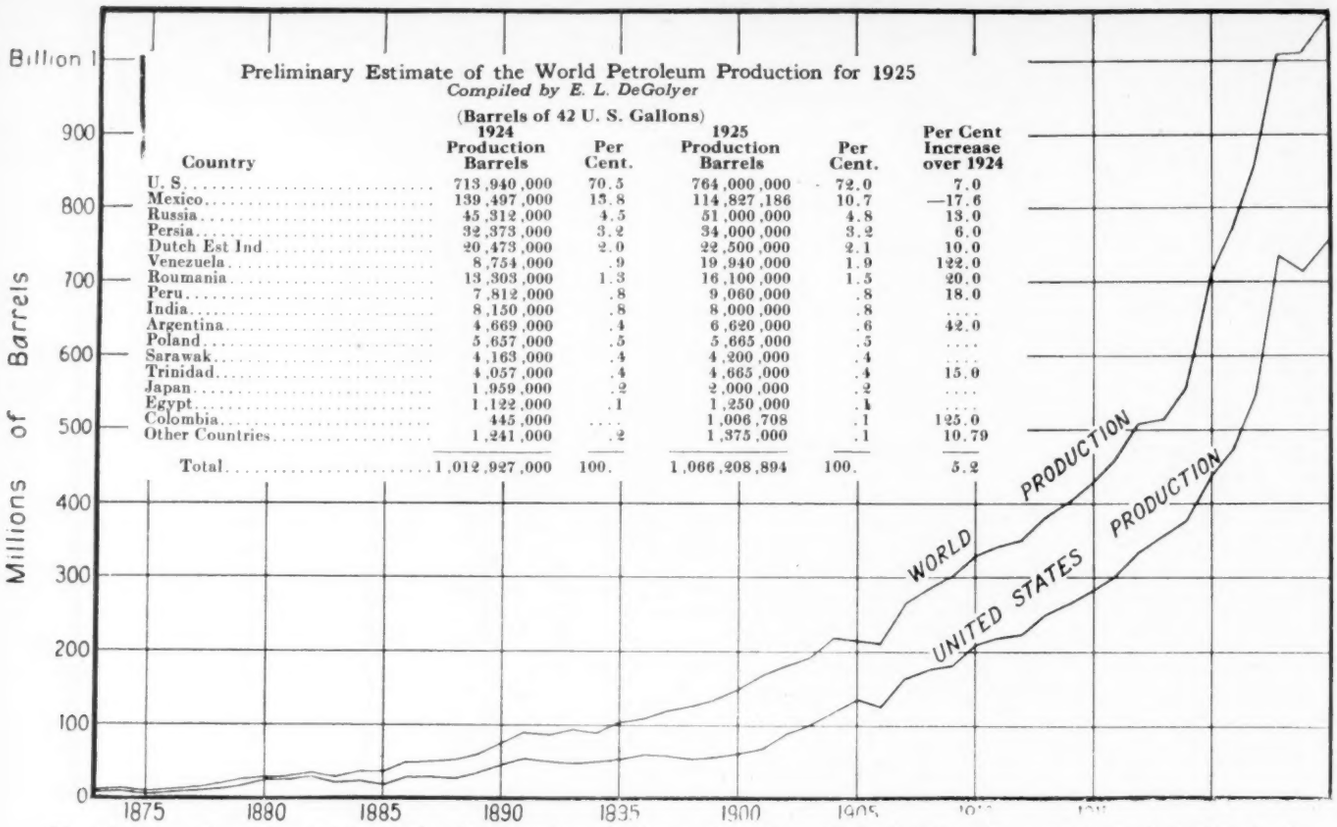
Outlook: "..... is for declining production. In foreign fields, Venezuela should show an increase of 10,000,000 barrels; Colombia an increase of 6,000,000 to 8,000,000 barrels; increases of a few million barrels each from Peru, Russia and perhaps the Dutch East Indies; more or less stationary production or slight increases in Persia, Roumania, Argentina, Poland, Sarawak and Trinidad; and considerable decreases in the production of the United States and Mexico."

Venezuela and Trinidad

Review of activities in Venezuela and the West Indies was prepared by Edwin B. Hopkins and H. J. Wasson, the former consulting geologist, New York, the latter geologist for the New England Oil Co. Their paper was published in nearly its entire length in National Petroleum News, Feb. 17.

They pointed to the fast increasing activity in Venezuela, both in drilling and in acquisition of land. Production for 1926 should be 10 to 15 million barrels greater than it was in 1925, when the total was around 20 million. Shipments into world markets probably will continue to be made by only the three

Chart and Table of World Oil Production in 1925



Preliminary Estimate of the World Petroleum Production for 1925

Compiled by E. L. DeGolyer

(Barrels of 42 U. S. Gallons)

Country	1924 Production Barrels	Per Cent.	1925 Production Barrels	Per Cent.	Per Cent Increase over 1924
U. S.	713,940,000	70.5	764,000,000	72.0	7.0
Mexico	139,497,000	13.8	114,827,186	10.7	—17.6
Russia	45,312,000	4.5	51,000,000	4.8	13.0
Persia	32,373,000	3.2	34,000,000	3.2	6.0
Dutch Est Ind	20,473,000	2.0	22,500,000	2.1	10.0
Venezuela	8,754,000	.9	19,940,000	1.9	122.0
Roumania	13,303,000	1.3	16,100,000	1.5	20.0
Peru	7,812,000	.8	9,060,000	.8	18.0
India	8,150,000	.8	8,000,000	.8	....
Argentina	4,669,000	.4	6,620,000	.6	42.0
Poland	5,657,000	.5	5,665,000	.5	....
Sarawak	4,163,000	.4	4,200,000	.4	....
Trinidad	4,057,000	.4	4,665,000	.4	15.0
Japan	1,959,000	.2	2,000,000	.2	....
Egypt	1,122,000	.1	1,250,000	.1	....
Colombia	445,000	....	1,006,708	.1	125.0
Other Countries	1,241,000	.2	1,375,000	.1	10.79
Total	1,012,927,000	100.	1,066,208,894	100.	5.2

Charted course of world production with table, preliminary estimate of world production in 1925. (Prepared by E. L. DeGolyer and presented at A. I. M. E. meeting, New York.

companies that were shippers last year—Shell interests, Gulf and Lago.

Colombia

Of considerable importance to the American oil industry, for the first time as having a direct bearing on supply and demand, is Colombia. A bonanza field whose proportions are not appreciated by many has been under development for five years. It is now on the point of flowing its oil through pipe line to tide water, to world markets.

L. G. Huntley, of Pittsburgh, geologist of years of tropical experience, reviewed Colombian petroleum affairs. Said he:

"Up to Dec. 15 there had been completed by the International company 63 producing wells, of which 41 had been completed since Jan. 1. At this time there were 7 wells drilling in or cemented, of which 5 were on the Infantas fold and 2 on a new fold to the northwest of that anticline. In addition there were 15 other wells drilling, of which 12 were located on the Infantas fold, 2 on the Colorado structure to the southeast and one on the new fold to the northwest.

"A remarkable feature of this development is the fact that of 77 holes drilled, only 7 have been lost. Three of these produced gas or oil and were only lost through unavoidable physical difficulties which are among the hazards of such operations. Three of the other lost holes would clearly have been wells had they been carried down to the sands which have since been proved as productive wells around them. This leaves but one hole which can properly be called a dry hole. .....

"The author claims that this is a record which will be hard to beat in foreign fields. This includes the proving up of four distinct structures, of which the Infantas fold has been developed for a lateral distance of 8 miles and a maximum width of one and one-half miles. The company has 11 rotary machines in operation."

A Pipe Line Record

On pipe lines: "The 360-mile 10-inch pipe line from Infantas to Cartagena was about two-thirds completed at the last of December. Construction was started in April, 1925, and the company expects to start to pump oil in May of this year. This also constitutes a record for tropical construction. The best record made in Mexico for a main-line through new country was seven months for an 18-mile line under much easier conditions than those found in Colombia."

The line, Huntley said, will have eight main stations and capacity of about 30,000 barrels daily. In December, an estimate was, there were 40,000 to 45,000 barrels shut-in production at Infantas.

New international pipe line concessions were granted during the year in Colombia, through the states of Apure, Tachira, Zuila and Amazones, in Venezuela. Both governments signed the concessions. .They make possible the opening of potential and some partially proven territory in Colombia east of the Andes.

Colombia had a spell of changing her petroleum laws during the past year. Some of the changes were satisfactory, said Mr. Huntley, while others "indicate a spirit to harass rather than to help the foreign investor."

Among principal changes listed in activities is the contract made between Gulf Oil Corp. and the Leonard interests, Gulf to drill; refinancing by Hayden-Stone of the Colombia Syndicate properties, formerly Guffey & Gillespie; operating contract between Atlantic Refining Co. and Andes Petroleum Corp., Atlantic thus being brought into the field.

Mexico

Two members of the foreign oil department of Henry L. Doherty & Co., Valentin R. Garfias, head of that department and R. V. Whetsel, reviewed Mexico, bearing with all modesty their honors of having "called the turn" early in 1925 on what would occur throughout the year, in production decline.

For 1925 production was about 114,000,000 barrels, a loss of some 25,000,000 from 1924. The decline has been about 40 per cent from the peak year, 1921. Last year's output was divided as follows: Southern fields, or "light" oil, 36,700,000 barrels; northern fields, 77,700,000 barrels.

Outlook: "Although the authors wish to again emphasize their belief that predicting future oil production of the Mexican fields where one or two big wells opening a new pool may double the country's yield over night, is but idle conjecture and very often misleading,

they nevertheless realize that a certain amount of judicious guessing is the only means of arriving at tentative figures of future supply; they therefore, fully discount their accidental fortunate guessing of a year ago, and in presenting their views on 1926 wish to caution the reader against giving the figures more weight than the authors themselves claim for them.

"With these limitations in mind and in view of present conditions and the past producing history of the Mexican fields, the indications are that the production for 1926, although lower than in 1925, will not show such a marked decrease as in the previous year. The production for 1926 should, therefore, be somewhat under 100,000,000 barrels, or over 15 million lower than that in 1925 which, in turn was about 25 million less than in the preceding year; the heavy oil output should be about twice that of the ligher crude.

"These estimates do not take into account the possibility of discovering entirely new pools, but it is hardly probable that with the curtailed exploratory drilling in wildcat areas the results along this line in 1926 will be more successful than in the preceding year."

Peru

International Petroleum Co. and Lobitos Oil Fields, Ltd., are the principle producers in Peru and they increased total production for the country by about 10 per cent, 1925 over 1924, reported L. G. Huntley. Total output of the country was about 9 million barrels. Scope of the International's operations since it has been in the country is shown by statistics credited by Mr. Huntley to A. M. McQueen, vice-president of the International. A total of 1990 wells had been drilled of which 1222 were producers and 8 were gas wells. The 1925 drilling resulted in 103 completions, 80 producers and two gas wells. Average initial production in 1925 was 200 barrels.

International has 58 strings of tools working in Peru and is building its second natural gasoline plant. Production was somewhat curtailed during the early months of the year when unprecedented rainfall occurred, caused by an unusual diversion of the Humboldt Current. Roads and trackage were washed out and some 12 pumping plants were shut down. At the end of the year the International's production was at the rate of 20,000 barrels daily while Lobitos was producing about 5000 barrels.

Argentina

A review of petroleum in Argentine was given by F. T. Ostrander. He is vice-president of the National Supply Corp., and has offices in New York. His estimate for the 1925 production, both government and private companies was 6,620,000 barrels. Of this amount 2,000,000 was credited to private companies. This total compares with a total of 4,866,000 barrels in 1924.

Outlook: "The prospects for 1926 indicate that there will be some increase over 1925 but not in a great amount. The wells when first brought in are not large but have good gas pressure. Some wells flow 5000 to 10,000 barrels for a time. With conservation of the gas pressure and judicious flowing of the wells, they would probably produce for a much longer time than at present.

"The government's program calls for the drilling of 150 wells next year against 100 for this year, but it is doubtful if this can be carried out. However, the recent opening of the new government refinery near Buenos Aires with a daily capacity of 15,000 barrels will make it necessary to increase their production. If improved methods can be more generally employed, the government production can no doubt be increased considerably. So far as one can prophesy, there are no indications that the production in Argentina will in any way meet the local demands in that country for a long time to come."

Russia

Steady improvement in the condition of the Russian oil industry was indicated in the extensive report made by Basil B. Zavoico, Sinclair Oil & Gas Co., Enid, Okla. The intimate acquaintance of Mr. Zavoico with Russian petroleum prompted his selection by the program makers as the speaker on this subject.

Production in the fiscal year 1924-25 amounted to more than 51 million barrels compared with 44.4 million in 1923-24 and prospects of steady gain, year by year. Mr. Zavoico's own opinion is that by 1929-30 the output will exceed 100 million barrels. New pipe lines and other improvements are factors in building up the industry. (Paper will be published in full in a subsequent issue.)

Near East

The oil production of the Near East is at present confined to Persia. E. L. Porch, Jr., of the Humphreys Corp., reviewed it briefly. Production in the fiscal year 1924-25 was about 28,473,000 barrels, which was a gain of about 4,000,000 barrels over the previous year. Prospects are for a nominal increase for the next year.

Petroleum Division Re-elects Watson

C. P. Watson

NEW YORK, Feb. 20.—The petroleum division of the A. I. M. E. saw no reason for conducting a wearing and energy destroying campaign over the secretaryship, so without nominating other candidates or finding it necessary to limit debate, re-elected Cresap P. Watson, of New York. He is entering upon his second term.

Mr. Watson is assistant to the president of the Amerada Petroleum Corp. He was born in Santa Barbara, Calif., in 1895. He first engaged in the oil business in Mexico with the Mexican Eagle Oil Co. This was in 1912. Until 1917 he served an apprenticeship which included the portfolios of roustabout, tool dresser, production foreman and assistant camp superintendent, in the Tampico northern fields and the Isthmus of Tehuantepec.

In 1917 he joined the army and saw the world, or at least France. He spent 18 months overseas. Returning, he joined the Amerada in 1919 and went to Houston as division manager. He remained there until 1922 when he was transferred to New York to the position he now holds.

Phillips Building First N. M. Gasoline Plant

Staff Special

TULSA, Feb. 22.—Phillips Petroleum Co. is building a gasoline plant in the Artesia field, New Mexico. It is to be of the latest type of absorption plant capable of handling about 5,000,000 cubic feet per day. This will be the first commercial gasoline plant in the state. It will be ready for operation in about 45 days. Contracts for gas have been made covering virtually the entire field.

Phillips is entering the Panhandle area in Texas also. The company recently purchased the plant of the American Gasoline Co. near Panhandle and is preparing to enlarge it as the gas supply in the field increases. At present the plant can handle from 15 to 20 million cubic feet per day.

In the north end of the field Phillips is building a second gasoline plant on Phillips acreage. Contracts have been signed covering a large area. This plant will be ready for operation about May 1.

Bureau of Mines Engineer Discusses Spacing of Oil Wells

NEW YORK, Feb. 22

AMONG papers presented during the symposia on oil producing methods, held by the petroleum division, A. I. M. E., was a survey of the subject of well spacing. This was prepared by Frank M. Brewster, petroleum engineer, U. S. Bureau of Mines.

"Spacing," said Br. Brewster, "is not so much a problem of determining how many acres a well will drain as it is a problem of obtaining the greatest possible yield at the minimum expense..... Property lines should be disregarded and the economic spacing of wells should be governed by subsurface conditions."

He set forth as important factors to be considered as affecting production structural position; thickness, porosity and grain size of sand; gas pressure and hydrostatic pressure; viscosity, capillarity, adhesion and surface tension of the oil; dissolved and occluded gasses; isothermal expansion and the gas-oil ratio in lifting oil.

Prominently before the oil industry today is the subject of restoring pressure with gas, air or water. Mr. Brewster briefly discussed these factors of recovery.

Gas Pressure

"Gas is the most active agent in the expulsion of oil, while capillarity and adhesion are probably the most active agents in the retention of oil in the sand. Gas pressure has to be excessive to overcome this capillary force. The radius of influence of wells in oil drainage is an important consideration in planning and development. This undrained volume of sand increases with the distance between wells. Due to friction a greater force is necessary to move oil one foot from the well. With a uniform pressure throughout the sand it follows that the areas near the well are more completely drained than those at a distance. But uniform pressures do not prevail throughout the life of a well. Hence the oil in the sand immediately surrounding the well will get the benefit of maximum pressure and needs it least while oil located at some distance from the well will have to move under a much reduced pressure prevailing during the latter part of the period of extraction. Furthermore, there is the probability of gas associated with the distant oil escaping though the unsaturated sands in the vicinity of the well, without doing useful work.

"This substantiates the practice of pumping air or gas into a sand and holding a pressure on the sand, not as a high differential in pressure between inlet and outlet wells but a nearly uniform pressure over the entire field.

"Under this pressure part of the gas will dissolve in the oil and will decrease the viscosity of the oil. Movement of the thinner oil can be effected with less energy and greater quantities of oil can be recovered but the dissolved gas is no longer capable of exerting any propulsive force and must be replaced with other gas to propel oil to the hole.

"The presence of gas in or occluded with the oil is an important factor in causing natural flow. Oil tends to form a film around a gas bubble and to be carried along with the gas. If gas is present in sufficient quantity and has enough pressure to overcome the column of fluid in the hole the well will flow. But eventually in the history of a flowing well there is a period when the gas pressure and volume are insufficient to case a natural flow. The forces moving oil are not constant and the drainage area constantly decreases. When a well is drilled the pressure is relieved at that point allowing both oil and gas to escape. This reduction in pressure allows the volume of the gases to increase, thus they grow larger and bring oil with them as they approach the hole. As the resistance is greater for oil than for gas, the gas is usually exhausted first and this frequently means the economic limit of the production of oil. For, in dissipating the gas, the oil has been robbed of its motive force and also of its lighter constituents and is left as a relatively heavy, viscous, dead oil with a high adhesive attraction and increased surface tension which the force of gravity is barely able to move.

Hydrostatic Pressure

"Hydrostatic pressure is that force exerted by a liquid and is an active agent in the expulsion of oil. The pressure or head on the oil must be sufficient to overcome capillary attraction and pore friction. This force is enduring and usually constant throughout the life of the field. The hydrostatic head developed within a sand is directly proportional to the depth of the superimposed column of fluid. In many fields containing oil or gas sands it is found that the closed-in initial pressure increases with depth and is proportional to the vertical depth below the outcrop of the strata in which the oil occurs. If edge water encroaches to fill the voids left by extraction of oil, theoretically, complete recovery could be expected. Under normal operating conditions, however, it seems improbable that it is capable of accomplishing anything more than a slow incomplete extraction.

"The pores are wet with oil and afford no capillary attraction for the water. The surface tension of the oil being lower than that of the water will cause the oil to adhere to the walls of the pores and resist displacement by water.

"The replacement of oil by water usually takes place very irregularly and is responsible for the trapping of large quantities of oil where a well or group of wells have flowed unrestricted and drawn the water through the coarser streaks in the sand. This unrestricted producing is also responsible for water coming in around a well. In a field producing entirely by hydrostatic pressure or where gas pressure is very low and hydrostatic pressure high, great care must be taken in spacing the wells so that the water drive can be controlled.

"The Hogback field in the Navajo reservation of New Mexico has no gas but the shut-in hydrostatic pressure is approximately 200 pounds at the well head. This field probably will have no pressure depletion throughout its life but the wells cannot be produced too rapidly as water has a greater surface tension than the oil and therefore a corresponding decrease in capillary attraction and will tend to by-pass the oil. In fields of this type the rate of flow through the sand should be determined and wells located and produced near the outer limits with a spacing that will give relatively periodic information on the progress of the water up the dip. But, unless its action is controlled on the producing wells by back pressure or restricted flow, the water tends to finger out causing the oil to move at right angles to the direction of the predominating water movement. Advantage is taken of this factor where water flooding is practiced and wells are staggered. Naturally, the most economic spacing is the triangular system having equal distances between wells."

Exports from Tampico District

Company	December 1925	January 1926
Transcontinental Petroleum Co., (Standard of New Jersey)	1,433,427	1,567,459
Pan American Eastern Oil Co	1,938,431	2,422,410
Mexican Eagle Oil Co., (El Aguila)	438,251	420,608
Cia. Mexicana Holandesa "La Corona"	400,456	485,506
The Texas Co. of Mexico, S. A.	107,716	139,174
Mexican Gulf Oil Co	250,055	731,703
Sinclair Mexican Companies	447,879	738,191
East Coast Oil Co. of Mexico, S. A. (Southern Pacific)	88,827	182,008
Panuco-Boston Oil Co	52,233	70,982
Mexican Oil Products Co	63,388	29,958
Empire Gas & Fuel Co	.....	119,334
La Espuela Oil Co	158,837	.....
Pierce Oil Corp	.....	2,992
Mexican Atlas Oil Co	38,970	.....
New England Fuel Oil Co	.....	.....
Interocean Oil Co	.....	.....
Freeport Sulphur Co	.....	.....
Totals	5,418,470	6,910,320

Many Ills of the Present Oil Industry Will Yield to Community Lease

By Fay L. Wright
Chief Geologist, Superior Oil Co., Los Angeles

Delivered Before Petroleum Division, A. I. M. E., New York, Feb. 15-17.

THE present leasing system has many disadvantages and resultant evils which can directly be charged with responsibilty for many of the major ills of the industry today.

It is apparent that the development of the oil lease has not been as rapid as the progress made in other departments of the industry, and it is surprising that a more concerted effort by all operators has not been heretofore made to analyze the problem thoroughly and to devise improvements which would relieve the situation.

At the present time little effort is being made by major operators to do otherwise than lease individual pieces of property in individual leases when it would seem so obvious that the community plan is the more advantageous.

In the mad rush to lease and develop lands most operators lose sight of the economic problem that will follow the discovery of oil. The present highly competitive system of development usually brings about a momentary flood of oil and a resulting loss to all producers. Fields are developed either at a tremendous sacrifice of capital or with an apparent loss in the maximum recovery of the oil in the great scramble to prevent some of the oil migrating to a neighbor's property. The greatest loss to the industry is the demoralization of the producer's market and the necessary reduction in prices of refined products.

If the structures which comprise Cushing, Burbank, Tonkawa, Smackover, Santa Fe Springs or Long Beach had been held on the proper lease basis, much of the demoralization which followed the discovery of each would have been eliminated.

Recent Attempts at Solutions

New suggestions have been advanced from time to time by persons both inside and outside the industry to remedy the evident difficulties in the leasing system. Of course, if all oil lands were owned in fee the problem would be greatly simplified; also the situation would be changed if each oil field was owned by a single individual and an individual operating company entrusted with the development. Unfortunately, these ideal situations have seldom been attained and it is probable they will ever remain an oil man's conception of "heaven."

One of the remedial plans suggested is that of unit operation of an oil field. Lester C. Uren† has recently written,

Herewith is a brief discussion of some economic aspects of one of the present widely discussed topics—the community oil lease. Much has been heard on the subject within the past two years. Mr. Wright, whose paper was presented before the petroleum division, American Institute of Mining and Metallurgical Engineers in New York, Feb. 17, relates some of the adaptations that have been made of the plan.—Editor.

"As a means of solving many of the difficulties inherent in the competitive system, there has recently been proposed a plan of field development and operation involving group control of oil properties, so that large tracts or even entire pools can be operated as units and without regard to property lines. Such a plan would undoubtedly permit of more scientific well spacing, better coordination of drilling programs and better gas pressure control, leading to greater ultimate recovery of oil. Maximum ultimate recovery of oil demands a certain measure of uniformity in these matters, and such unanimity of action can be secured only by mutual agreement among all operators concerned, or by merging their interests to form a single operating unit. Other important advantages offered by the unit system are a reduction of development costs and a means of preventing overproduction of oil, thus establishing oil prices."

" 'The advantage accruing to oil producers through the operation of the unit plan will be readily admitted by all who have had contact with the evils of the competitive system, but there is as yet no general agreement as to how such a consolidation of interests might be equitably effected. The unit plan, to be acceptable to the industry generally, must leave property rights inviolate and give a reasonable measure of freedom to private initiative and enterprise in seeking profits in petroleum exploration and production. Any plan that contemplates government domination or control of the oil industry would not be welcomed by most operators. Whether or not an acceptable unit plan can be evolved is perhaps uncertain, but the advantages of group control from the standpoint of petroleum conservation and increased financial return to the oil producer are indisputable."

John Hays Hammond‡ is an advocate of unit operation of oil fields even to the extent of having legislation passed to make it required, to quote, "I believe that the proper application of the community lease offers much. Whenever the private interests can agree among themselves on a plan of development that will preserve the principle of unit operation, the community lease requires no legislation. I am convinced, however, that in the typical oil pool of the Mid-Continent and California, where the ownership of the surface is broken up and in the hands of many individuals the community lease would seldom succeed unless backed by legislation."

The Colorado Attempt

Within the last two years a very good example of attempting the ideal of leasing has been accomplished by the Union Oil Co. of California†† This company, after bringing in a large gasser on the Wellington Dome in Colorado, conceived the idea of using a community plan of development which would eliminate much wasteful offset drilling and insure for the landowners involved a fair distribution of royalties. This plan was unique in that it adopted an entirely new method for putting all interests on an equitable basis, and was put into operation even after the entire dome had been leased on individual leases. The outline of the structure had been contoured rather closely by surface geology prior to discovery of the gas so all that was necessary to place the plan in operation was to choose a contour line, which was considered to be the limit of probable production. All lands within this line were unified under a community lease, while those lands situated outside were left under their original leases. The key to the plan lay in the working out of a unit basis in which the individual lease owner acquired an interest in the community lease in proportion to the ratio of the acreage in the single lease to the acreage in the community lease. The landowner then would receive royalty on his tract of land regardless of whether or not a well had been drilled upon it, provided royalties were due under the community lease.

There are many advantages to the Wellington Dome plan of operation among which are the elimination of unnecessary offset drilling, simplification of royalty accounting and the saving of gas pressure on the top of the dome, bringing about a more economical

†Lester C. Uren: A Comparison of Methods of Oil Field Development. Oil Bull. (Jan., 1926).

‡John Hays Hammond: Advocates Unit operation of Leases—A. E. Heiss. National Petroleum News (April, 1925).

††Tolbert R. Ingram: New Plan Community Lease Will Aid in Cheaper Oil Recovery. National Petroleum News (May, 1924).

and undoubtedly greater ultimate recovery of oil.

A striking example of cooperation between operators in the development of a field along a unit plan involving economic and sensible lines may be shown in the Dominguez Hills field of southern California. Here a plan of development was worked out between the principal operators without negotiating with the landowners. The limits of probable production of the field were undeterminable at the time the plan was put into effect but the practicability of the plan has been very forcefully proved and is quite evident when the development results obtained in this field are compared with the nearby Rosecrans-Athens field, in which no such plan was used. This comparison can best be shown by a recount of the salient facts concerning these fields.

The Dominguez field was discovered during September, 1923, by the Union Oil Co. of California and, to Jan. 1, 1926, had produced a total of 20,299,599 barrels of oil from a total of 73 wells, an average of 278,076 barrels per well. In this field there are 600 acres of land considered proved, with a well spacing of about one well to 10 acres. The field was producing at the rate of 24,454 barrels per day from 59 wells, on Jan. 1, 1926, an average of 414 barrels per well per day. The number of dry edge wells drilled in this field to define its limits is 14, and of the number of producers completed, five will probably not pay back their original cost.

The comparative figures of the Rosecrans-Athens field show a marked difference in the results obtained. This field was discovered during May, 1924, by the Union Oil Co. of California and the Barnsdall Oil Co. jointly, and the field has produced to Jan. 1, 1926, a total of 7,800,000 barrels of oil from 133 wells, an average of 58,646 barrels per well. There are 400 acres of land considered proved as of Jan. 1, 1926, with an average well spacing of one well to 2.5 acres. The field produced 24,443 barrels from 97 wells, on Jan. 1, 1926, an average of 252 barrels per well. The number of dry edge wells drilled in this field to define its limits is 34 and of the number of producers above given, a total of 33 will probably not pay back their original cost.

This comparison shows very obviously that the industry is the loser by many millions in the case of the Rosecrans-Athens field in comparsion with the Dominguez field. Rosecrans-Athens field was developed under no plan of unit operation and with few attempts being made for community lease operation although there were several notable community leases in the field, and was a very good example of frenzied town-lot development. Dominguez field represents an example of very business-like development, with all the operators cooperating in the manner of spacing of wells, and in agreeing to develop only one zone at a time. These examples are given only to show comparative results, for it is hardly fair to compare the merits of these two fields on account of their basic differences in make-up, and because field for field, the Dominguez field is a much more valuable field than the Rosecrans-Athens field.

Within the past year a new and rather striking experiment in community leasing was successfully attempted by the Superior Oil Co. (California) in the Belvedere Gardens area in the Los Angeles Basin. For years this area has been coveted by many geologists for it was apparently the one remaining field yet to be drilled, in the famous Los Angeles, Montebello, Whittier, Brea-Olinda chain of fields, being situated equi-distant and at the proper spacing distance between the old Los Angeles field and the Montebello field. The reason that this area had not been explored before was because about 40,000 people lived on the approved acreage and it was fully subdivided into town lots and paved streets. No company had considered it practicable from a leasing standpoint to attempt to exploit this area until early in 1925 when the Superior Oil Co. began a campaign of leasing heretofore unequalled. Obviously, the negotiation of community leases was the only practical solution of the problem for it would have been impractical for any operator to consider leasing separate lots and thus have some 4000 or 5000 separate drilling obligations on its hands, after bringing in a well.

The plan evolved caused the favored area to be divided into four main parcels, and the landowners of each division were given the opportunity of entering into a single community lease covering that parcel. The royalty offered was not the customary one-sixth, as is usual in the Los Angeles Basin but was one-eighth, with no bonus given for signing the lease. The computation of royalty was based upon the ratio of the area of each lessor's parcel compared to the total area of that particular lease. A novel feature of the plan was that landowners could participate in the lease whether their lands were contiguous or not, and in this way a total of approximately 2000 individual landowners was consolidated into four community leases. The principal community lease negotiated had more than 1000 signatures of individual owners, and an additional 1000 signatures attached by their wives, all of these signatures being notaried.

A Difficult Task

A remarkable feature of the leasing campaign and one that made the procurement of signatures very difficult was the fact that the area involved comprised the "East Side" of Los Angeles and the population here was made up of Mexicans, Russians, Serbians, Armenians, Indians, and Assyrians, many of whom could speak no English, as well as a group of very fine Americans most of whom were in very humble circumstances. The principal inducement for obtaining the signatures to the leases was the tentative promise of a test well, which well has since been drilled to a depth of 5023 feet with negative results.

The important point to be made of the above illustration is the great good which might have resulted if the test well drilled in this closely settled and completely cut up area had been successful. The drilling requirements under separate leases would have been prohibitive from an economic and financial standpoint, while under the community lease plan, a prolonged drilling period could have been maintained and the wells could have been properly spaced,(conserving the gas pressure and producing a maximum recovery of the oil per well. The landowners would have materially benefitted by such an arrangement because it would have "averaged their bet" in that possibly under the single lease plan no well might have been drilled upon their particular piece of property or in that it might be situated completely off the structure. The community lease plan would probably insure for the landowner as well as for the operator a more equitable price for the oil produced and the evils of overproduction might have been eliminated. Surely the community lease plan is an improvement over the present individual lease method.

Conclusion

We may appropriately summarize the more important deductions to be drawn from the foregoing discussion as follows:

1. Oil leases have not kept pace with the rest of the industry in its development.

2. Many of the ills of the industry are caused by the present methods of acquiring leases.

3. The industry as a whole is not fully aroused to the great need for adjustment of leasing methods, but a few outstanding examples of adjustment have been attempted in recent years.

4. The unit plan of development is being more widely discussed than ever before and has been attempted successfully in at least two instances.

5. The community lease has many and should have more widespread use advantage over the individual lease among operators.

Simms to Build Refinery in Smackover Field

TULSA, Feb. 23.—The Simms Oil Co. will erect a refinery in the vicinity of the Smackover field, Arkansas, this year, it was decided at a recent meeting of the board of directors. The plant will have a capacity of about 2,500 barrels per day. No site has been selected or other work done as yet.

Other development work of the company will include the erection of a natural gasoline plant in the field on some site to be selected north of Smackover creek. The plant will have a capacity of 10,000 to 15,000 gallons per day.

Simms has a large production of both oil and gas in the Smackover area which will be used as raw material for the refinery and gasoline plant.

How Pipe Still Compares With Shell Still For Oil Distillation

By John Primrose
Vice-president, Power Specialty Co.

Delivered Before Petroleum Division, A. I. M. E., New York, Feb. 15-17.

THE increasing use of pipe stills for distillation has been one of the outstanding developments in the refining of petroleum during recent years. At first their use was confined very largely to the Pacific coast, where they were used for topping California crude. The lighter products were recovered overhead and the residue used for fuel oil, for which, due to the lack of other fuel, there was and is a large demand.

The equipment used was very simple and might be described as a home-made product usually built of material easily obtainable in any refinery.

Installations varied in detail in accordance with the ideas of the individual designer, but agreed in the general principles involved. In the simplest form they consisted of a pipe still for heating the crude, a chamber for separating the vapor from the heated oil, and usually a liquid heat exchanger with the necessary condensers and pumps.

Pipe Still Construction

The pipe still, so called, was constructed of pipes usually 20 feet long flanged at the ends and connected in series by means of flanged cast return bends. These pipes were arranged in a convenient bank of heating surface over a furnace and enclosed in a brick setting.

The heating surface was supported on the brick work and the return bends were usually bricked in. This construction was somewhat crude, but for the low temperatures required was fairly successful, and came into general use.

However, difficulties were encountered in adequately supporting the long pipes enveloped in hot furnace gas, and in preventing overheating of the oil in the pipe nearest to the furnace.

These difficulties resulted in many different forms of setting, but in the best of them it was necessary in order to avoid overheating, to burn the fuel with large quantities of excess air for combustion, thus maintaining a low furnace temperature.

As a result the consumption of fuel was large, although the fuel efficiency compared favorably with that of shell stills.

Improvement in Design

The design and performance of these earlier installations afforded a splendid basis for development. It was soon apparent that the performance could be improved by completing combustion of the fuel in the furnace, and absorbing a greater part of the heat contained in the products of combustion before they enter the flue.

These requirements were met by constructing a furnace of sufficient volume to insure complete combustion of the fuel, and by arranging the heating surface in a separate chamber, but in open communication with the furnace.

In this way the hot furnace gas, completely burned, was forced into intimate contact with the tubes of the heating surface, and cooled to the greatest degree by being in contact with the tubes containing the coolest oil just before entering the flue.

Having completely burned the fuel and extracted all of the available heat in the products of combustion, the only remaining way, to save fuel, neglecting radiation, was to reduce the air supplied for combustion, thereby increasing the furnace temperature and reducing the weight of furnace gas and, therefore, the heat lost up the stack.

It was found, however, that the heating surface, although screened from the direct heat of the fire, overheated and burned the oil at high furnace temperatures because of heat radiated from the hot brick work of the setting. This difficulty was met and successfully overcome by replacing the objectionable brick work with a part of the heating surface so arranged to co-operate with the balance, that none of the heating surface was subjected to over intensity of heat.

More Improvements Expected

This briefly sketches the structural development of the pipe or tube still up to the present. Doubtless further improvements will be made from time to time, but even now the temperature of the flue gas is often not over 100° hotter than that of the oil entering the still, and the fuel burned with little more than sufficient air to insure good combustion. This results in an overall fuel efficiency closely approaching that of the best steam boiler practice.

Where the temperature of the oil entering the still from the heat exchange or other source of heat is high, and consequently the temperature of the flue gas is correspondingly high, a large part of this heat can be recovered by preheating the air used for combustion.

The success of pipe stills for topping light cuts indicated a possible field of usefulness as preheaters for preheating the crude charged to continuous batteries of shell stills.

Pipe stills were tried out on this work and found to work advantageously chiefly because they increased the capacity of the battery, saved fuel, and greatly relieved the first shell of the battery.

It was for a long time, however, thought necessary to finish the distillation in shell stills. These stills were liberally supplied with steam to prevent overheating of the bottom sheets, and at high oil temperatures it was necessary to exercise great care and considerable skill in operation to prevent burning the oil.

In fact the operation, at temperatures sufficiently high for the production of lubricating stock, for instance, was so delicate, and required so much skill, that refiners generally hesitated to change from well established methods which they knew by experience would produce the desired result.

Some Burning Unavoidable

Even when using large quantities of steam in shell stills and the best of care in operation, a certain amount of burning of the oil was unavoidable, and the cost of fuel, burned under the stills and for production of the steam required, was high.

The problem of heating oil to the high temperatures necessary for the recovery of the heavier and higher boiling point products is evidently that of applying heat in such a way that only the necessary amount will be supplied at the required temperature.

If these requirements are but slightly exceeded, particularly at high temperatures, overheating and burning of the oil will result. As the heat required is first produced in a furnace and transmitted to the oil through the metal wall of a vessel containing the oil, it is necessary to control the temperature of the wall of this container.

This can only be done when the oil is swept over the surface at a rate of speed high enough to absorb heat from the wall as fast as it is supplied by the furnace. If the oil absorbs heat at a lower rate, the temperature of the metal wall will rise sufficiently to burn any oil in contact with it.

Difficulty in Shell Still

Is is obviously difficult to circulate or agitate the large volume of oil contained in a shell still at a rate sufficient to absorb the heat as fast as it is supplied to the shell, and also to maintain a uniform temperature throughout the mass.

It is this essential requirement of proper heating that the tube still fulfills in the greatest degree. The oil under treatment is split up into small

streams and is positively circulated through the tubes by a pump at a high rate of speed.

The heat of the furnace is distributed among all of the tubes so that every stream receives some heat. The tubes nearest the furnace are, of course, the hottest, but the oil to be heated should enter the tube still where the tubes are coolest, near the flue, and flow towards the hottest tubes.

In this way the oil will be slowly heated at first, but as it rises in temperature the heat will be applied more and more rapidly and at maximum speed just before the oil leaves the tube still. As the oil leaving the tube still is immediately expanded in a vapor separating chamber and the vapor removed—a cooling operation—the oil is only at the maximum temperature momentarily.

Splitting up the Vapors

This can be done in a number of ways, but probably the best so far developed is a combined vapor separator and fractionating column equipped with bubble trays, well known as an effective means of separating a mixture into its different boiling point components.

A combined tube still and fractionating column will produce boiling point fractions with but one application of heat. None of the products produced by this combination require re-running, except wax-bearing distillates which must be re-run following the pressing or centrifuging operation.

It is true that if a mixture of different boiling point liquids is to be split up into various boiling point fractions, a series of redistillations must be carried out. This, even today, is practiced in many refineries, involving the heating up and cooling off of some products many times. The expenditure for fuel is enormous.

The fractionating column is practically a series of stills arranged one above the other, the reflux or over-flow material from the trap above acting as the condensing medium, but by actual contact instead of through intervening heating surface as in most heat exchangers or condensers.

Further, in the fractionating column the re-distillation is accomplished in one piece of equipment, with but one application of heat, and continuously.

This combination of tube still and column, together with heat exchangers, condensers and pumps, results in a complete distilling unit having many attractive features among others—

It reduces the danger of fire.

It is flexible and can be used for any disillation process.

It is continuous in operation.

It is easily controllable both as to capacity and temperature.

It is possible to go to high temperatures without burning, and thus recover maximum products overhead.

It is economical in fuel.

It is economical in steam.

It is economical in space occupied.

It is economical in first cost.

Several Phases of Core Drilling Discussed by Authorities

NEW YORK, Feb. 22

DUE notice was given by the petroleum division of the A. I. M. E. this week to exploratory methods in oil field finding. In a symposium on production held on Monday four papers were heard on core drilling.

A general review and description of the operation of diamond drills was read by P. W. Donivan of the E. J. Longyear Co., Minneapolis, prepared in collaboration with R. D. Longyear, president of the company.

J. E. Elliott, Los Angeles, contributed a paper on the Elliott core drills, with special emphasis on the Alco core drill made by the company which Mr. Elliott heads. This type is widely used in California and is rapidly being introduced into the Mid-Continent and the Southwest.

An amazing amount of material is sometimes cored. Said Mr. Elliott:

"The Elliott Alco core drill successfully cored E. J. Miley's Athens No. 6 oil well (world's deepest producer) at intervals from 4526 to 7591 feet, alternating in runs with a Hughes rock bit. One hundred and fifty-four runs with the core drill cored a total of 1067 feet and recovered 740 feet of core. It should be realized that this work was done in hard rock. In the softer formations encountered at shallower depths, several drills have made five runs of 20 feet each without being resharpened and recovered 100 per cent of the core. . . . So far as we know the record is held by the same type of drill while working for the Universal Oil Co. at Lost Hills, when it cut 180 feet of hole without being resharpened and extracted 144 feet."

Tells of Basket Cores

E. Call Brown, of the California Petroleum Corp., Los Angeles, contributed a paper on basket core barrels, probably the shortest paper ever published by the A. I. M. E. Basket cores, still widely used in some parts of the country, probably are not subject to a great deal of explanation, as the tendency is to abandon their use altogether. Mr. Brown set forth a few of the advantages of the basket core, one of them being that it can be made of scrap casing by anyone in the field. He said that there is still plenty of room for improvement in types of core barrels now generally used.

John G. Bartram, Casper, Wyo., division geologist for the Midwest Refining Co. and John H. Wilson, Denver, subsurface geologist for the Midwest, contributed a paper on the use of core drilling in geological exploration. On the phases of most interest to the operator, rather than to the geologist, they said:

Geological explorations by oil companies, state and federal surveys, and private consulting geologists, resulted in the mapping of the greater part of the structures to be found in the Rocky Mountain region. Most of the promising structures have been drilled and few remain that are generally regarded as favorable for the accumulation of oil and gas. Undoubtedly, a few structures, some of which may produce, exist beneath Tertiary overlaps and more recent gravel terraces and soil-covered areas. The finding and investigation of these structures must be done by core drilling or by geophysical methods.

"A consideration of the area of oil-producing land compared with the total area of the region will show the folly of systematic core drilling of covered areas in the hope of picking up structures that will produce oil and gas.

Operating Data

"Local operating conditions are materially different from those of other oil fields. The Midwest Refining Co. is employing two Longyear 2N Fordson-driven diamond drills. The Gypsy Oil Co. is using a Sullivan CN Fordson-driven drill, and the Interior Exploration Co. recently purchased one of the same type. The Continental Oil Co. contracted for some structure testing with the Sullivan Machinery Co., on which contract a steam-driven drill was used. Core drills, other than diamond drills, have been used to a limited extent but have not come into general favor.

"In the Rocky Mountain region water is often scarce and must be hauled for considerable distances. Therefore gasoline or kerosene engines are preferable to steam power for driving the drill, as the latter requires transportation of boilers and bulky fuel, and time must be spent in moving, setting up, and getting up steam. The gas-driven drills of the Midwest Refining Co. were in practically uninterrupted operation last winter.

"Cretaceous shales and sands, in which most of the drilling has been done, "wash" badly and double-tube core barrels taking 1⅛-in. core have been found advisable.

"Costs have varied from extremes of $1.25 to $6.00 per foot, but are now running approximately $2.75 per foot on the average structure. This is in excess of some core drilling costs in the Mid-Continent fields but long distances between operations, the building and maintenance of camps, long hauls for fuel, water and other supplies, and adverse weather conditions naturally increase costs.

A graduate geologist is in charge of each drill. He is responsible for efficient operation and the solution of the geological problems connected with the work. He must correlate the cores, although his correlations are checked by other company geologists before they are accepted as final."

Liquid Sulphur Dioxide Treating Process Useful For Many Products

By Dr. L. Edeleanu
Roumanian Chemist, Inventor of Process

NEW YORK, Feb. 17

THE results obtained by refiners by the use of the sulphur dioxide treating process as a substitute for the older method of treating with sulphuric acid, shows that this process is of very great advantage in refining crude oil distillates whatever their origin may be and it seems destined to become a very valuable element in the oil industry.

The Edeleanu process is suitable for the treatment of a variety of distillates to make various products. The main features of the process are:

1. The process permits of the extraction of the very best products from low grade crude oils.
2. There is practically no loss of raw materials or chemicals used in the refining operation. The sulphur dioxide is easily recovered.
3. This process leaves no waste as the by-products obtained find ready use in industry and commerce.

The process of Dr. Edeleanu consists in the treatment of the oils with liquid sulphurous acid (sulphur dioxide), and is based on the fact that the liquid sulphurous acid acts as a solvent agent, extracting from the oils heavy hydrocarbons, asphaltic and sulphur bearing materials, these having a deleterious effect upon the commercial and industrial value of the finished products.

In the following the advantages of the process are specified with regard to the various distillates obtained from crude oils.

Treating Kerosene Distillate

Treating of the distillates with liquid sulphur dioxide frees them, as is well known, of the aromatic hydrocarbons. In this way an "extract" is obtained which consists mainly of aromatics, whilst the distillate from which they were extracted, the SO_2 "Raffinade," represents a kerosene with good burning qualities equal to the best "water-white" kerosene.

Recent tests have further shown that it is possible to obtain even from a distillate of very low grade properties, and containing a high percentage of sulphur, a kerosene of quite exceptional qualities by subsequently treating the "Raffinade" with a very small quantity of sulphuric acid.

This kerosene burns with a steady illuminating power for 18 or more hours. The lamp chimney does not even show a trace of soot deposit. Kerosene thus obtained is of the highest quality. See tables 1 and 2 herewith.

The refined kerosene described is now being manufactured on the Pacific coast by means of the Edeleanu process from California distillates, where commercial plants are already in operation. Substantial extension of these plants is being considered.

The possible uses of the "extract" have also been studied. Up to recently the "extract" has been considered only as a fuel oil or Diesel engine oil. It has

TABLE NO .1

The illuminating power of oils obtained by the ordinary refining method and by the Edeleanu-Process.

Origin	Refining Process	Specific Gravity	Degrees Baumé	Illuminating power Photo-metric measurements at each hour in international candles* 0	1	2	3	4	5	6	7	8	Average of 8 hours	SMOKETEST
Bustenari	Original Distillate	0,820	40.73											
	Ordinary Process	0,8195	40,83	8,0	7,9	7,9	8,0	7,9	7,9	7,9	7,4	7,4	7,8	Bad
	SO_2 process	0,8028	44,39	15,3	14,8	14,7	14,7	14,7	14,4	14,2	13,9	13,8	14,5	Good
Campina	Original Distillate	0,8125	42,30											
	Ordinary Process	0,812	42,41	11,5	11,2	11,2	11,0	11,0	11,0	11,0	11,0	11,0	11,1	Unsatisfactory
	SO_2process	0,797	45,66	17,4	17,2	17,0	17,0	17,0	16,5	15,9	15,9	15,9	16,6	Good
Tintea	Original Distillate	0,8195	40,83											
	Ordinary Process	0,819	40,94	10,4	10,0	9,3	9,3	9,3	9,3	9,3	9,1	9,1	9,5	Bad
	SO_2process	0,809	43,05	14,7	14,7	14,7	14,7	14,7	14,7	14,7	14,7	14,7	14,7	Good
Argentine Oil	Original Distillate	0,8005	44,89											
	Ordinary Process	0,800	45,00	14,9	13,2	10,2	9,1	8,2	7,0	6,4	5,6	4,8	8,8	Bad
	SO_2process	0,792	46,77	17,0	16,4	15,9	15,2	14,9	14,5	13,3	13,0	12,7	14,8	Good
Egyptian Oil	Original Distillate	0,811	42,63											
	Ordinary Process	0,810	42,84	12,2	12,0	11,7	11,3	11,1	10,9	10,7	10,7	10,4	11,2	Unsatisfactory
	SO_2process	0,797	45,66	17,2	16,8	16,3	16,3	15,9	15,9	15,9	15,4	15,0	16,1	Good
Californian Oil	Original Distillate	0,811	42,63											
	Ordinary Process	0,810	42,84	10,4	10,1	9,9	9,5	9,3	9,1	9,0	9,0	9,0	9,5	Bad
	SO_2process	0,798	45,44	16,3	15,9	15,4	15,0	14,7	14,4	14,2	14,2	14,0	14,9	Good
Peru Oil	Original Distillate	0,818	41,17											
	Ordinary Process	0,817	41,36	12,4	11,9	11,5	11,0	10,7	10,4	10,2	9,9	9,9	10,9	Unsatisfactory
	SO_2process	0,807	43,48	15,9	15,3	15,1	15,1	15,0	15,0	14,7	14,0	13,4	14,8	Good
Mexican Oil mixture of ordinary and cracked distillate	Original Distillate	0,803	44,35											
	Ordinary Process	0,8025	44,45	13,1	12,9	12,5	12,2	11,7	10,9	10,4	10,4	10,2	11,6	Unsatisfactory
	SO_2process	0,793	46,84	17,0	16,7	16,4	15,8	15,3	14,7	13,9	13,4	13,2	15,2	Good
Dutch-Indian Oil	Original Distillate	0,8205	40,62											
	Ordinary Process	0,820	40,73			BURNS IN NO LAMP.							—	
	SO_2process	0,799	45,22	14,7	14,2	13,9	13,9	13,4	13,2	13,1			13,8	Good
Shale Oil Distillate	Original Distillate	0,800	45,00											
	Ordinary Process	0,800	45,00	14,0	13,4	13,3	13,1	13,0	12,5	12,4			13,1	Unsatisfactory
	SO_2process	0,785	48,34	17,9	17,9	17,3	17,3	16,8	16,5	16,0			17,1	Good
Qualities of illuminating oil brand sold on the market.														
Pennsylvania W. W.		0,792	46,77	15,9	15,7	15,3	15,0	14,3	14,2	12,9	11,2	11,0	14,0	Good
Pennsylvania St. W.		0,799	45,22	14,2	13,5	13,2	13,1	12,4	12,2	11,3	10,8	10,2	12,3	Good

*This test was made on a German Kosmos burner with a 7/10-inch wick.The flame in the photometric measurements was raised to the highest point where a flame was still obtainable without producing smoke.If the flame is adjusted according to the regulations of the standard test used in the United States in a hinge burner,the treated oils will show almost no change in the illuminating power from the beginning to the end.

been found, however, that, when redistilled, the fraction with an endpoint of 428 degrees F. forming 35 to 50 per cent of the "extract," will, if blended with gasoline, improve the quality of the latter. This fraction of the extract corresponds in its burning qualities with the homologues of benzene (benzol) and acts as an antiknock medium, besides increasing the motor power of the gasoline.

A High Value Product

Therefore, about half of the extract is not only not going to waste, but actually gives a product which is more valuable than kerosene and can be sold at the price of gasoline. The fact that the process converts a part of the kerosene distillates into a motor fuel consisting of hydrocarbons similar in character to benzol increases its value considerably especially for the United States where benzol or similar hydrocarbons are not produced in sufficient quantities.

California and Rumanian oils, if treated by the process, furnish roughly 25 per cent "extracts," half of which, or about 12 per cent, can be used for blending gasoline. Assuming for Californian oil a plant with a daily capacity of 3750 barrels, 1,125,000 barrels of kerosene distillate could be treated per annum, producing 277,000 barrels of "extract" half of which, about 138,500 barrels could be used for improving gasoline. As an addition of 15 per cent of "extract" is sufficient to improve the quality of U. S. Motor gasoline, about 900,000 barrels of gasoline could be blended with the 138,500 barrels of "extract" mentioned above to produce anti-knock motor fuel. Similar results are obtained from the very low grade kerosene distillate of Venezuela, which yields about 22 per cent "extract," half of which may be used for blending gasoline. The refined kerosene resulting from the treatment of Venezuelan oil by liquid sulphur dioxide has very good burning qualities. It has an illuminating value of 15 candle power; percentage of sulphur is reduced to 0.03 so that the kerosene corresponds in quality with the best on the market.

Good For Rubber Solvent

The fraction of the "extract" up to 392 F. on account of the contents of aromatics, is a proper solvent for rubber and may be used with advantage as a solvent medium like white spirit or as a turpentine substitute. The properties of this fraction are shown in Table No. 3 in comparison with the properties of fractions obtained by direct distillation from crude oil.

The cost of treatment by the Edeleanu process amounts to $0.95 (maximum) per metric ton (7½ barrels) of distillate treated in a plant of 3750 barrels daily capacity. This includes a writing-off of 10% on the installation and all operation costs including materials. In respect to these operating costs it is necessary to consider that by using a part of the "extract" as described above, one obtains a by-product of a considerably higher value than the raw material treated and even of higher value than kerosene.

This increase in value is so substantial that it not only covers cost of operation but even provides a surplus. The residue of the extract which cannot be used as gasoline blend, has at least the value of fuel or gas oil.

Treating Gas Oil

Up to recently the Edeleanu process has not been used for the improvement of gas oil. Conditions, however, have fundamentally changed since gas oil was introduced as a raw material for obtaining gasoline. It has been found that in cracking heavy oils the result is the more satisfactory the less the raw material contains matters rich in carbon, asphaltum and sulphur compounds.

Bearing this in mind, we are bound to arrive at the conclusion that it must be advantageous to treat gas oils, which are rich in carbon, asphaltum and sulphur compounds, by the Edeleanu process before they are cracked and tests have proved this to be the case.

The "extract" obtained by treating gas oil with liquid sulphur dioxide can be used as gas or fuel oil and is of nearly the same value as the original gas oil.

The "raffinade," on the other hand, being cracked, gives a better yield of gasoline and the gasoline contains a greater proportion of low boiling hydrocarbons.

Table No. 2

Sulphur content of several Mexican and other oils before and after the treatment by the EDELEANU Process.

Origin of the oil	Weight of the original oil		Weight of the oil treated by Edeleanu Process		Percentage of Sulphur		
					Original oil	After treatment by the Edeleanu Process	After treatment by the Edeleanu Process and subsequent treatment with ½—2% of sulphuric acid
	sp. gr.	°Be	sp. gr.	°Be.			
Mexican Oil No. 1	0.774	50.88	0.763	53.49	0.25	0.07	0.01
Mexican Oil No. 2	0.790	47.22	0.777[5]	50.07	0.46	0.17	0.04
Shale-oil illuminating oil fraction	0.797	45.66	0.781	49.26	0.27	0.08	....
Persian Oil	0.795	46.10	0.781	49.26	0.14	0.08	0.06
Texas Oil	0.827	39.29	0.826	39.49	0.12	0.04	0.01[5]
Several distillates from Mexican oils	0.815	41.78	0.799	45.22	1.12	0.31	0.04
	0.812	42.41	0.796	45.88	0.94	0.24	0.08
	0.807	43.48	0.790	47.22	0.82	0.23	0.10
	0.818	41.15	0.793	46.54	1.14	0.14	0.03[4]

Table No. 3

	White Spirit known in Europe under the name "Sangajol", obtained by direct distillation.	White Spirit obtained by distillation of Rumanian Crude.	Fraction of the extract up to 260 °C	Fraction of the extract up to 195 °C
Color	water-white	water-white	water-white	water-white
Flash Pensky Martens closed cup	20.5 °C	27.5 °C	24.5 °C	24 °C
Drying Quality	One drop will leave no fatty stain by evaporation on resin free paper after exposure for 30 minutes.			
Distillation in Engler Flash	Volume %			
Up to 130 °C*	1.0	....	....	....
Up to 140 °C	44.0	2.0	2.5	1.5
Up to 150 °C	79.0	26.5	30.8	36.0
Up to 160 °C	93.0	52.5	57.5	63.5
Up to 170 °C	97.5	68.5	74.0	59.5
Up to 180 °C	98.0	79.5	86.0	90.5
Up to 190 °C	99.5	86.5	92.0	96.0
Up to 200 °C	....	90.5	95.9	98.0

*The results are adjusted to half percent.

Table No. 4

Results obtained by comparative treatment with aluminium chloride of crude gas oil and of gas oil previously refined with sulphur dioxide.

Sample treated	Properties of crude sample		Products obtained by Al. Cl. treatment: Crude gasoline distillate		Gasoline obtained by rerunning of the crude gasoline distillates			
	Gravity	Distill. range Distill. between	Vol. %	Gravity	Vol. % up to 212 °F	Vol. % up to 302 °F	Vol. % up to 428 °F	Gravity of gasoline up to 428 °F
1) Crude gas oil of California	30.2 Be 94%	527-670 °F	73.4	45 Be	10.3	14.3	28.7	55.2 Be
2) SO_2 treated gas oil of California	37.3 Be 94%	527-670 °F	79.6	62.6 Be	29.7	44.9	61.5	63.6 Be
3) Crude oil Albrecht	22.0 Be 74%	572-670 °F	49.7	50.6 Be	25.2	49.2	83.2	52.5 Be
4) SO_2 gas oil Albrecht	25.6 Be 74%	572-670 °F	69.0	55.1 Be	30	60.5	90.2	56.4 Be
5) Crude gas oil Rhenania	28.0 Be 99%	572-670 °F	63	49.2 Be	18.8	46	78.2	51.1 Be
6) SO_2 gas oil Rhenania	33.9 Be 99%	572-670 °F	81	57.1 Be	32.2	61.5	88.7	58.2 Be
7) Crude gas oil of California	30.2 Be 94%	527-670 °F	66.0	52 Be	21.0	43.2	65.4	57.2 Be
8) SO_2 refined gas oil of California	37.3 Be 94%	527-670 °F	90.3	69.5 Be	43.1	76.4	95.2	67 Be

With samples No. 1-6 the experiments were made in glass flask.
With samples No. 7-8 the experiments were made in an iron container with stirring device.
The apparent discrepancies in the results of No. 1 and 2 and No. 7 and 8, although the experiments being made with the same distillates, are due to the fact that the distillation has been made under different conditions and carried on up to different temperatures.

Table No. 5

Results obtained by comparative treatment of crude White Oil Distillate from California, with the usual Sulphuric Acid Process and the EDELEANU Process

100 parts of crude distillate gravity Be. 17.08, treated with the ordinary process with sulphuric acid	100 parts of crude distillate gravity Be. 17.08, treated with the EDELEANU process (200 parts sulphur dioxide in counterflow)
Yield:	**Yield:**
37.8 parts finished medicinal oil gravity 26.78	37.6 parts finished medicinal oil gravity 27.13
	42 parts Extract to be used as lubricant
57 sludge acid 5.2 neutralizing and washing } loss	16.7 sludge acid 3.7 neutralizing and washing } loss
Consumption of chemicals:	**Consumption of chemicals:**
2% sulphuric acid (66 Be.)	1.2% sulphuric acid (66 Be.)
100% fuming sulphuric acid (20% SO_3)	23.2% fuming sulphuric acid (20% SO_3)
0.3% caustic soda	0.3% caustic soda
3 % alcohol	3 % alcohol
	1 % sulphur dioxide (the maximum loss by recovering the sulphur dixoide)

Table No. 6

Results obtained by the comparative treatment of Crude Transformer Oil Distillates with the usual Sulphuric Acid Process and the EDELEANU Process, with a view to obtain transformer oil which stands the Michie Test (sludge test).

Distillate—Gravity 29 Be.

100 parts of distillate treated with sulphuric acid (66 Be.) and fuming sulphuric acid (20% SO_3)	100 parts of distillate treated with sulphur dioxide (4x100% SO_2 at 10°C) corresponding to a treatment in counterflow with 150% SO_2
Yield:	**Yield:**
59.2 parts finished transformer oil standing the Michie Test	64.2 parts finished transformer oil standing the Michie Test
	20.0 parts Extract (to be used as lubricant)
35.7 parts sludge acid 5.1 parts neutralizing and washing } loss	.2 parts sludge acid 5.6 parts neutralizing and washing } loss
Consumption of chemicals:	**Consumption of chemicals:**
17 parts sulphur. acid (66 Be.)*	13.6 parts sulphur. acid (66 Be.)
80 parts fuming sulph. acid (20% SO_3)	16.0 parts fuming sulph. acid (20% SO_3)
0.5 parts caustic soda	0.4 parts caustic soda
3.2 parts alcohol	3.5 parts alcohol
	0.8 parts sulphuric dioxide (the maximum loss by recovering the sulphur dioxide)

*In the treatment with the sulphuric acid process the figures for sulphuric acid represented the minimum quantity of sulphuric acid which is necessary for obtaining a transformer oil, giving by the Michie Test 0.1% sludge.

There is very much less carbon deposit, and the original distillate being free of sulphur compounds by preliminary treatment with liquid SO_2, the corrosion of cracking plant equipment will be minimized. If the conversion of gas oil into gasoline is effected by catalytic action, as for instance by means of aluminium chloride, the advantages of using a gas oil preliminarily treated with SO_2 are striking.

A series of laboratory tests have been carried out which show that if gas oil previously treated by SO_2 be cracked catalytically under certain conditions, it gives a yield of gasoline distillate very much higher than is obtained from untreated gas oil and further that this gasoline contains about twice the amount of light hydrocarbons.

According to the original composition of gas oil the yield of the gasoline distillate varies between 50-95 per cent of the treated gas-oil. But for all gas oils treated, the preliminary treatment by SO_2 will produce an equally higher percentage of gasoline. For illustration the examples are given in Table No. 4.

(Dr. Edeleanu explains that the superior yield of gasoline and the higher quality of gasoline produced by catalytic cracking of gas oil treated with SO_2 is due at least in part to the removal by the SO_2 treatment of the substances which reduce the reactivity of the catalyst, "poison" it and so shorten its useful life—Editor.)

Lubricating Oils

The chief point to be noted here is that the process offers great advantages in all cases where oils of a superior quality are required, such as transformer oils, turbine oils and white oils for technical as well as for medicinal purposes. The refining processes which are being used today for manufacturing these oils eliminate all aromatic hydrocarbons, asphaltic and Resinous substances contained in the raw material by means of considerable quantities of sulphuric acid, and in some cases of great quantities of fuming acid.

The amount of sulphuric and fuming acid used varies according to the raw material treated, but in some cases, as by white oils, is as much as 100 per cent; on the other hand, the loss in the original material of the same oil is sometimes as high as 70 per cent. By the Edeleanu process the hydrocarbons which are destroyed by the the acid treatment, can be extracted from the raw material. The "extract" thus obtained may be used and sold as a lubricating oil of second quality, especially after subsequent, very light treatment with sulphuric acid.

Those parts of the raw material which have not been extracted by SO_2 are now eliminated according to the process by treating the "raffinade" with sulphuric acid, the important difference being that less acid is needed than in the old process. In some cases it is not necessary to treat with acid at all, the usual neutralizing and washing with water being sufficient. Compared with the old methods of manufacturing special lubricating oils, the saving in acid is so great that in most cases, even if there is only a moderate sized plant, the cost of the plant can be written off in one year.

Treatment with SO_2 permits of obtaining transformer oils standing the Michie test (sludge test) from very low grade distillates, as those from Venezuela, California, Mexico, etc., and of a very high stability satisfying all possible requirements.

In the accompanying Table 5 and 6 are shown the relative yield and consumption of chemicals by using the old and new processes.

The Edeleanu process has been adopted by the following companies:

Royal Dutch Shell,
Anglo-Persian Oil Co.,
Standard Oil Co. of California,
Standard Development Co.,
Associated Oil Co.,
Union Oil Co.,
Deutsche Erdoel-Aktiengesellschaft, Berlin.

Nicholas, Shaw to Address New England Jobbers

BOSTON, Feb. 23.—An announcement of the second annual convention and frolic of the Independent Oil Men's Association of New England, to be held on March 10 and 11 at the American House, Boston, has recently been mailed to members by P. A. Brewer, chairman of the convention committee.

The principal speaker will be L. V. Nicholas, president of the National Petroleum Marketers Association, Chicago, whose topic will be "Looking Forward." Another important speaker will be Raymond Shaw, advertising director of the same association. Mr. Shaw's address will include a stereopticon review of past, present and future national advertising campaigns.

Among the other more important subjects which will be discussed by prominent oil men are state gasoline taxes, carbon monoxide gas, the future source of gasoline supply, development of filling station, and domestic fuel oil and oil burners in the home. Other topics will be discussed and an exhibition and lecture with moving picture views of refinery operations will be on the program.

An exhibition of marketing equipment will be a feature of the meeting. The musical program includes the American House orchestra and a marimba band. A vaudeville show will be staged after the banquet on March 11. Luncheons will be held both days at 12:30 p.m.

Refining Section of A. I. M. E. Gives Refiners National Forum

By Paul Truesdell
N. P. N. Staff Writer

NEW YORK, Feb. 17

A PERMANENT forum where refinery technologists and operating men of the whole country can meet at least once a year to shed the light of their own experience on operating problems and discuss together the advancement of the art, was assured by the success which attended the first meeting of the refining section of the petroleum division of the Institute of Mining & Metallurgical Engineers, held here Feb. 15 and 16 in connection with the annual general meeting of the institute.

The organization of the refining section represents a broadening of the scope of the petroleum division of the institute which heretofore has concerned itself entirely with the geological and producing phases of the industry. The petroleum division of the institute for several years has been growing in numbers and in importance.

The addition of a section dealing with the refining branch of the industry is the idea of F. Julius Fohs, chairman, and other officers of the petroleum division, their intention undoubtedly being to make the petroleum division as broadly representative as possible of all branches of the oil industry. At the election of officers which was one of the proceedings of the institute meeting, a vice chairman of the petroleum division to have charge of the activities of the refining section was provided for and C. H. Osmond, for many years associated with the Atlantic Refining Co. and now a refinery consulting engineer, was elected to that office.

Mr. Osmond is well known throughout the refining industry.

A National Meeting Ground

While both the Western Petroleum Refiners Association and the National Petroleum Association, which latter is composed mostly of the western Pennsylvania refiners, hold annual meetings which are valuable for the opportunities given refiners of getting together and listening to the experiences of others in meeting the problems that confront them every day, it is felt by some that these meetings are largely local in character and that the refining section of the institute will furnish a broader and more general platform on which the refiners from all sections of the country will be able to get together.

While the papers and discussions presented at the first meeting were rather general in character for the most part, they gave a good idea of the advancement that has been made in the refining art during the past few years, showed plainly the most urgent problems now pressing upon the refinery operating men for solution and gave a glimpse as to what the important developments of the immediate future are likely to be.

The papers and discussions divided themselves into three predominant subjects; cracking, both from the practical operating standpoint and from the economic side; improvements in straight distillation methods; and treating of cracked distillates. The principal thought back both of the cracking and treating discussions was the development of the greatest possible yield of anti-knock motor fuel which has become a subject of increasing interest to the oil industry.

Roland B. Day, consulting engineer of New York, discussed cracking mainly from the economic standpoint. Mr. Day estimated that about 35 per cent of our present day gasoline is the product of cracking stills and asserted that the maximum efficiency of refineries will be reached when the percentage of cracked gasoline reaches 62 per cent.

He does not expect, however, to see this accomplished very rapidly because of the restrictions it would impose on the use of gas and fuel oil. Arthur Knapp, United Gas Improvement Co., Philadelphia, discussing "The Economic Incidence of Cracking" from the standpoint of a large gas oil user, asserted the belief that it will be a long time before the increasing cracking operations of refiners will measurably reduce the available supply of fuel and gas oil because of the fact that the refiner can find a ready and usually profitable market for these materials without going to the added expense of cracking them.

Thinks Gas Oil Supply Assured

He believed that for a long time to come, the preferred uses of fuel and gas oil, such as in the manufacture of artificial gas and for the operation of Diesel engines will put it in position to compete successfully with the automotive engine for its potential gasoline content. Mr. Knapp did not mention the increasing use of Diesel-electric locomotives on the railroads but there are many who think that the development of this engine is going to reach exceedingly large proportions in the immediate future with its consequent increasing demand for gas oil or a similar fuel. "The Economic Incidence of Cracking" was a joint paper by Mr. Day, Mr. Knapp and Benjamin T. Brooks, consulting engineer.

Mr. Brooks called attention to the reversal of opinion that has come in the past few years regarding the presence of olefins and unsaturated hydrocarbons generally in cracked motor fuel. He pointed out that in one of the earliest applications for patent on cracking, the production of a saturated gasoline was pointed out as a virtue and the patent was issued partly on the proposition that the method of cracking sought to be patented produced a paraffin product.

"However, we know now that this claim was not true at all," said Mr. Brooks, "and it was a good thing for that man's company that it was not." Mr. Brooks went on to discuss the comparatively recent discovery that some of the most valuable constituents in cracked gasoline, from the important standpoint of anti-knock value, are these same despised and misunderstood unsaturated compounds.

Charles L. Parmelee, consulting engineer of New York, discussed cracking chiefly from an operating standpoint, in a paper, "Character of and Principles Involved in Cracking." He traced the development of the cracking art from its beginning, giving the problems that have been overcome and the problems still to be faced. He stated that there are 26 cracking processes in actual commercial use and 28 others being tried out experimentally.

The statement that such a large number are being commercially used was a surprise to most of his hearers and Mr. Parmelee later declined to name all the processes referred to, stating that his information had come to him in a confidential way and that he was obligated not to divulge it.

Warns of Patent Situation

One of the important parts of his paper was his statement on the patent situation existing in the cracking art. He stated that there are some 2500 issued patents and applications purporting to cover various phases of cracking, that there are some 15 suits pending in the

courts and yet not one of the patents has ever been adjudicated.

In view of this confused and uncertain situation he warned the technologists of the industry in making improvements in cracking operations and equipment to step warily lest they find themselves afoul of some of the multitude of patents purporting to cover almost every conceivable phase of the art. Mr. Parmelee's paper is published on another page of this issue.

Walter Miller, manufacturing manager of the Marland Refining Co., Ponca City, Okla., read two papers, "Basic Changes in Refining Processes" and "Economic Effect of Basic Changes in Refinery Operation." In the first mentioned paper, which is published elsewhere in this issue, Mr. Miller stated that the spotlight that has been focussed on the development of cracking during the past few years has largely placed in shadow the remarkable achievements that have been made in straight distillation and other phases of refinery operation.

These he gave roughly as improved fractional condensation; improved fuel economy through heat exchange and through the adoption to an increasing degree of pipe stills, by the use of cannon furnaces, by the preheating of air for combustion and through recirculation of flue gases and through rebuilding of shell stills to reach more nearly the efficiency of pipe stills by putting banks of tubes in the body of the still, below the oil level, to act on the principle of the return tubular boiler. Among other improvements he named contact filtering and continuous acid treating and sulfur dioxide treating.

He also pointed out some of the problems yet to be solved among which were a suitable treating method for cracked distillate that does not involve removing the unsaturated and naphthenic constituents—the valuable anti-knock compounds—from the gasoline. He stated that the Gray process of treating the distillate with fullers earth in the vapor phase, which has been in commercial use at three plants for some time, seemed to offer the most promising solution.

Along this line, Dr. Walter Cross, during the discussion, stated that he has developed a method of treating distillate in the vapor phase with fullers earth on which copper oxide has been deposited, from which he hopes for important results. Dr. Cross said that this treating method would remove the undesirable sulfur compounds from the distillate as well as the gum forming constituents, which would be an advance over the straight clay treating method inasmuch as with the latter it is in some cases necessary to give the distillate a treatment in the liquid phase with doctor solution after it has been through the clay treating tower.

New ideas as to the gum forming constituents of gasoline, particularly cracked gasoline, came to light in discussion. Doubt was thrown on the value of present established tests for gum forming content of gasoline by several of the technologists, among them being Mr. Parmelee, Dr. Delbridge and Dr. Gustav Egloff of the Universal Oil Products Co. (Dubbs)

Dr. Stanwood W. Sparrow of the Bureau of Standards, Washington D. C., who read a paper "New Gasolines and Anti-Knock Compounds," told the oil men that whatever the gum-testing methods might mean, the presence of gum in some gasolines is a sad fact which he knows from his own experience with airplane engines. He stated that in some fuels tested by the Navy aviation branch, the formation of gum was such as to stick the valves.

There was little disposition to minimize the presence of gum in some gasoline but the principal contention was that the present method of testing does not give an adequate index of the gum forming possibilities of the gasoline in operation. It was suggested by one technologist after the meeting that it is likely that the formation of gum in operation will be found to be a function of the carburetor adjustment. His idea was that the anti-knock fuels, which are mostly cracked fuels, require a greater amount of air for complete combustion and that the formation of gum results from the admission of too little air into the cylinders.

Mr. Miller's second paper, which will be published in a later issue of this paper, stated that the savings in manufacturing costs being achieved by the refiners through better understanding of principles involved and improvement of their equipment and operating methods to take advantage of these principles, are being reflected directly to the automobile user in lower prices for fuel and lubricating oils.

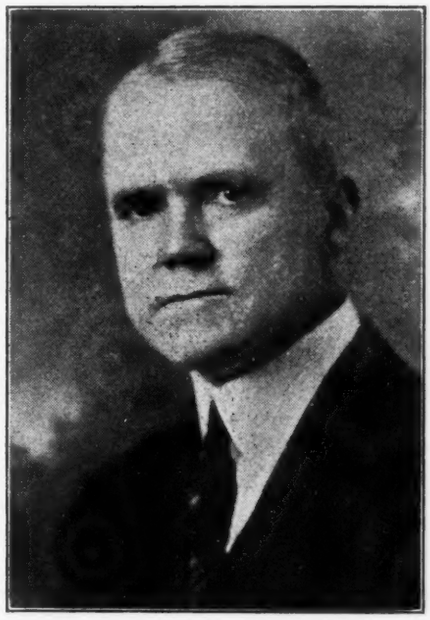
Saving Motorist $200,000,000 A Year

His estimate was that the improvements already made in refining processes are worth at least $200,000,000 a year to the American motorists.

A paper by Dr. Roy Cross describing the Cross process was read and Dr. Egloff read a paper describing the Dubbs process. In this paper Dr. Egloff predicted that the time is coming when crude oil will be run directly into a single unit which will skim, crack and fractionate the oil into finished products on a once-through pass.

"Distillation by Pipe Stills" was discussed by John Primrose, vice president of the Power Specialty Co.; "Fractionation" by W. A. Peters Jr., E. B. Badger's Sons Co., Boston; "Wax Separation" by Max B. Miller, Max B. Miller Co., New York. Mr. Primrose's paper is published in another part of this issue. Other papers mentioned will be published in later issues.

Oil Producer Is New A. I. M. E. Officer



B. O. Mahaffey

NEW YORK, Feb. 20.—The oil industry is now represented in the official family of the American Institute of Mining and Metallurgical Engineers by two company executives. The latest to be elected a vice-president of the Institute—referring to the major organization and not the petroleum division—is Birch O. Mahaffey, president of the Silurian Oil Co., St. Louis. The other vice-president, elected previous to the past week's meeting, is E. L. DeGolyer.

Mr. Mahaffey has been in oil producing business since 1914 and his election to the presidency of the Silurian company is a development of recent weeks.

He was born in Texas in 1877. He attended the U. S. Military Academy at West Point from 1898 to 1901.

After several years on railroad and highway work and land surveying, he went to Ann Arbor and completed the civil engineering course for the bachelor's degree at the University of Michigan, in 1906. Then he took the course in the Army Ordnance School of Engineering at Sandy Hook, in 1909 and engaged in army ordnance work until 1914.

He has been particularly interested in the application of best engineering principles to the development and management of oil properties.

WASHINGTON, D. C.—The American Oil Co., Baltimore, has just completed the installation of storage tanks which will double its storage at this branch. This additional equipment will take care of increased business on Amoco motor fuel, according to Lee Sonneborn, manager of the Washington branch.

Three new filling stations have recently been completed and opened for business by the Lord Baltimore Filling Stations, subsidiary of the American Oil at Washington. The Lord Baltimore has purchased four other sites for stations.

U. S. Fields to Decline, Stocks Will Be Drawn Upon, is Estimate

By Lawrence E. Smith
N. P. N. Staff Writer

NEW YORK, Feb. 20

MEMBERS of the petroleum division, American Institute of Mining and Metallurgical Engineers, met Monday, Tuesday, Wednesday, at 29 West 39th St., in the Engineering Societies Building, home of many technical organizations and scene of many notable gatherings. The engineers interested in petroleum assembled to discuss the present state of the oil industry—economics—to hazard opinion as to what the present year holds in store, to discuss advances in the methods of producing, transporting and refining oil.

Opinions were duly hazarded and they amount to this: That the production from fields of the United States probably will go on declining; that Mexico will decline; that South American imports into the United States will not more than offset what we lose from Mexico (1925 basis) and that important withdrawals will have to come from present stocks to meet the demand, which is certain of increase.

Men were chosen to discuss the several producing sections of the world. The selection of speakers was, as is usual on this occasion, determined by their close familiarity with the topic assigned. The list was a long and imposing one.

For the production symposium, speakers reviewed the history of the fields for 1925 and presented the overlook as based upon present conditions. Length of these papers and their large number prevent presentation here of more than the "high spots" of each.

F. Julius Fohs, chairman of the petroleum division, A. I. M.E., summarized important conclusions of the several papers on production and gave this as his conception of the outlook:

Decline Is Foreseen

1. Likely to increase production (present year): Gulf Coast and Texas outside of Gulf Coast.

2. Just maintain present production or decline somewhat: California and Appalachian.

3. Likely to decline: Mississippi Valley, Rocky Mountain, Kansas-Oklahoma, Louisiana and Arkansas.

"It is unlikely," he said, "that the Gulf Coast and Texas, outside of the Gulf Coast, will more than offset the possible decline in California, while in the Mississippi Valley and Rocky Mountain districts the decline will probably continue at a rate of about 10 per cent and in Kansas-Oklahoma a much greater decline from flush pools may be expected: ..... the decline for the year may reach somewhere around 100 million barrels."

Spokesmen for California were G. C. Gester, chief geologist of the Standard Oil Co. of California and E. W. Wagy, of the same organization. They gave briefly the sequence of events which made California of prime importance to the petroleum world.

"During 1923, California produced 263,729,000 barrels of crude petroleum, or a daily average of 723,000 barrels. ..... Storage and pipe line facilities were materially increased and further relief was obtained when large quantities of petroleum were shipped to the eastern coast of the United States.

"Late in 1923 production began to decline and continued to do so in 1924. ....The daily average production of 606,300 barrels at the close of the year (1924) approximately balanced the total crude oil demand, and, while stocks had been increasing since early in 1921, the rate of increase had slackened considerably.

"In 1925, California produced approximately 231,000,000 barrels of crude oil, or a daily average of about 633,000 barrels .....consumption within the district showed a normal increase and shipments of gasoline through the Panama Canal attained record volume. An excessive increase in the output of fuel oil necessitated some new storage and major pipe lines were completed from the San Joaquin Valley and Ventura to southern California."

Fields responsible for the rise in 1925 were Inglewood, new field, deep sand at Ventura Avenue and extension to Long Beach.

On Inglewood: The proven area in July, 1925, was about 780 acres, since somewhat increased. Peak production was in week ending Aug. 1, average daily 110,000 barrels. Now down to about 60,000 barrels. Wells are 1400 to 3150 feet deep and are completed in six or eight weeks. Some have had initial productions of 4500 barrels. Inglewood added importantly to the excess of fuel oil on the Pacific Coast. Oil averages 20.2° A.P.I. and averages 11.6 per cent navy gasoline.

On Ventura Avenue: Further developments promised, as the field is not fully defined. Deep production from depths of 4000 to 5800 feet. It requires generally a longer time to complete wells than in other southern California fields. The average crude from the field contains about 33 per cent navy gasoline. High mark of the field thus far exceeds 30,000 barrels.

Long Beach: Producing area extended to northwest during 1925. The new area is divided into town lots and drilling now is furious. Some wells in the new area have had initial outputs of 1500 to 2000 barrels; initials in December were averaging 300 to 400 barrels. Most wells are more than 4000 feet deep and many of them are finished in two months.

The authors gave a table of California production and consumption, as follows:

California Crude Oil Production and Consumption*
In Barrels of 42 Gallons

Year	Total Production	Total Domestic Consumption Plus Normal† Shipments	Total Eastern Shipments Through Panama Canal
1916	91,598,000	104,933,000	
1917	93,888,000	108,853,000	
1918	97,531,000	100,748,000	
1919	101,564,000	102,854,000	
1920	105,668,000	113,979,00	
1921	114,709,000	102,068,000	
1922	139,671,000	117,060,000	2,775,000
1923	263,738,000	179,975,000	53,213,000
1924	230,063,000	171,185,000	45,758,000
1925	231,000,000‡	182,500,000‡	18,748,000‡

*Data from A. P. I., Bureau of Foreign and Domestic Commerce and Panama Canal Record, Jan. 12, 1926.
†Normal shipments include Pacific Ocean trade only.
‡Estimated.

Production Shut In

"There was a tendency among operators throughout the state to shut-in production during 1925 rather than to produce it and store the oil," said Messrs. Gester and Wagy. "As the storage situation became more acute, shut-in production increased from about 28,000 barrels daily average in March to about 63,000 barrels in November, 1925. The latter figure represents a potential output which will be available when conditions warrant."

New deep sands, other than at Ventura, were not prominent in California's 1925 history. In August, the Obispo well in the Maricopa Flats region of the Sunset field began flowing about 10,000 barrels daily from a deep sand at about 4000

feet. It sanded up and was eventually completed at 3000 barrels daily. It caused some excitement but, said the authors, final results were not encouraging as water soon came in quantity and the fluid from the well has since been badly cut.

Requirements for crude oil in the territory normally supplied by California showed a gain of about 7 per cent over 1924 and averaged about 500,000 barrels daily. In August the refiners made a high record by averaging runs of 572,300 barrels of crude oil to stills. Stocks of residuum fuel became a burden and prices fell, from $1.65 per barrel, f.o.b. refinery, early in 1925 to $1.04 in the latter part of the year. New markets were created for fuel oil as a result and in December shipments through the Panama Canal reached an average of 40,000 barrels daily

Light and heavy crude and fuel oil added to inventories in California during the year amounted to about 20,000,000 barrels.

Gasoline was important in the 1925 history of California. Refinery output averaged about 112,000 barrels (42 gallons) daily for the year, an increase of 28 per cent over 1924. This was about 30,000 barrels daily more than was needed in California's natural trade territory and the by-now familiar Panama Canal route was utilized with such success that the gasoline shipments away from the Pacific totalled 14,400,000 barrels for the year, or 39,400 barrels daily. Storage of gasoline was thus drawn upon. Low tankers rates, (recently materially increased), were a factor in aiding the gasoline movement to Atlantic markets.

The big increase in gasoline production came from utilizing refinery capacity and not from increase in cracking operations which the authors describe as being unimportant compared with Eastern operations. Natural gasoline production, however, was important, gaining about 26 per cent during the first 11 months of 1925 as compared with the same period of 1924. Several new plants were built, others enlarged. November's natural gasoline production was about 23,000 barrels daily.

Looking Ahead in Oklahoma

Oklahoma and Kansas were discussed by Burr McWhirt, geologist and valuation engineer of the Roxana Petroleum Corp., Tulsa. Setting out that Oklahoma opened the year with a daily production of 495,100 barrels and closed with 448,000 barrels; that Oklahoma declined on yearly total but little from its banner year, 1924 and that Kansas showed a substantial increase, Mr. McWhirt pointed to the fallability of predictions, described the predicting of the future in oil production as a "precarious pastime and often of little value," but was emboldened to "scan the possibilities and probabilities of 1926," merely as "one man's conjecture." Said he, after making these qualifications:

"Oklahoma:—In Oklahoma, Tonkawa is likely to produce very much less oil in 1926 than it has in 1925. Burbank will probably show a decline, but less, relatively, than Tonkawa. Judging by the recent rates of decline, Burbank should produce more oil in 1926 than Tonkawa. It seems improbable that the known sands in the Garber pool will produce as much oil in 1926 as they did in 1925. Cromwell and Papoose pools seem doomed to a further steady decline.

"There is a vast amount of settled production in north-central, northeastern and southwestern Oklahoma that will form a substantial nucleus for 1926 production. New pools are required constantly, however, to maintain or increase the state's annual production. The required new pools are not now in sight. With the exception of the newly discovered deep sand at Wewoka, the writer can think of no partly developed discoveries that seem likely to become major pools. There are possibilities for substantial new production, both in new areas and by deeper drilling in old areas. There are many possibilities of developing new Wilcox sand pools, by drilling deeper, all the way from Pontotoc county north and northeast to the Kansas line. Kay, Grant, Garfield and Noble counties are potential areas for other Tonkawas and Garbers. Core drills are busy in these counties and may discover some good pools.

"The present declining production and strong crude oil market are almost sure to stimulate a drilling campaign that will test out promising areas and thus open new pools to hold up the 1926 gross production.

Kansas in Good Position

"Kansas:—....is starting 1926 off with 20,000 barrels per day more production than she had at the opening of 1925. It seems hardly probable to the writer that the 'shoestring' pools will show as much areal extension, nor as much new production, in 1926 as they have shown in 1925, because there are a number of dry holes scattered along the trend in advance of production. Pay spots between dry holes, and even a change in trend, are possible developments. There will be a substantial settled production from the old 'shoestring' area.

"Considerable core drilling has been done in Kansas during the last two years in Butler and Cowley counties and west. It is reasonable to expect some new pools may be opened on the basis of this work.

"With wildcatting somewhat more active than a year ago, and the daily production higher to start the year, the writer sees no reason why 1926 should not be fully as prosperous for the oil business in Kansas as was 1925."

New Coastal Salt Domes

Several speakers, notably F. Julius Fohs, predicted big results, not immediate but within the next few years, from the location of Gulf Coastal salt domes by geophysical methods, (torsion balance and seismograph). Louis Freedman, Houston, geologist for Marland Oil Co., formally presented the review of this region. He pointed to the discovery of five new domes by these methods, in 1925. These are Fanette, Jefferson county; Hawkinsville, Matagorda county; Starks, Calcasieu parish, La.; Allen, Brazoria county and Clemmons, five miles north of Allen. They have not been proven oil productive, but their location, in the absence of "paraffin dirt," oil seeps, elevations, etc., the signs of the older domes, is regarded as a considerable triumph.

"Since 1901, when Spindletop was discovered, no one year has yielded as large a number of new domes as 1925 when five were found," said Mr. Freedman. "In 1902, three new domes were found, and in 1917 three more were discovered. In 1925, five domes were found under more difficult conditions and with no aid from surface indications."

South Liberty was the big contributor of flush production in 1925 from salt dome structures. During the year it yielded about 4,500,000 barrels of oil from an area of about 105 acres. Mr. Freedman said. It is still making more than 9000 barrels daily, although little drilling has been done for four or five months.

Developments late in the year which may ripen into important fields are Boling dome, Wharton county, where the real discovery well made 4000 barrels flush and Piedras Pintas dome, Duval county, where the discovery made 1500 barrels. In the latter is a peculiarity. The oil tested 43° and contains at least 75 per cent gasoline and kerosene, an unusual grade of oil from a salt dome. This field is an important landmark, says Mr. Freedman, as it is fully 150 miles from nearest salt dome production and lends an important aspect to vast acreage.

New Texas Pools Probable

In Texas, outside the Gulf Coastal territory, big things are expected during this year. Said Frederic H. Lahee, chief geologist for the Sun Oil Co., who discussed the territory:

".....as a result of the intensive exploratory work of the past year, work which is continuing into 1926, we may confidently expect the opening of several pools. West Texas, more than any other district in the part of the state now under consideration, is looked upon as having the greatest possibility for new discoveries."

He began with consideration of the Central Red River District. Archer county, scene of much development in the past three years, completed 1505 holes drilled during 1925 of which 575 were dry. Some eight new pools were discovered and older ones extended. Archer county has each year gained in production and last year supplied the imposing total of 13,578,000 barrels.

Wilbarger county made some petroleum history. The Noble pool, which is about six miles south of the older South Vernon pool, has moved along rapidly since last June and Mr. Lahee estimated the final productive acreage to be about 3400 acres, at present regarded as the "largest potential source

of high gravity oil in the north Texas district. The discovery sand was at 2300 feet, afterward an 1800-foot pay was found. Imposing flush yield will not be built up because of lack of gas pressure.

Progress was slow in the Panhandle. Said Mr. Lahee: "Several new wells have served to stimulate further development, but the small size of the wells and the distance of the operations from the markets, as well as problems of recovering the oil, have prevented any intensive drilling campaign. The discovery, in 1924, of oil and gas in the Culbertson test well, in central Carson county, has not been followed up by more testing of this side (south) of the Panhandle structure. Except for this well, all the oil produced has come from the north side of this uplift."

Dry and Without Showings

Considerable activity was had in the northward extension of the Mexia fault zone, (northeastern Navarro, western Henderson, eastern Kaufman, Hunt and Hopkins counties), but "no encouragement has been found in the way of good oil showings in any of the one hundred odd deep dry holes drilled in this territory, north of Powell."

There were no new discoveries during the year in the original Mexia fault zone territory.

Lytton Springs Caldwell county, was the important contribution in 1925 of the central and southern counties. It was discovered in March and up to the end of the year about 300 wells were drilled. The field yielding during the year more than 2,570,000 barrels. Productive area is about 1500 acres and is defined except on the southeast side.

There is now, said Mr. Lahee, considerable interest in the further testing of a strip of territory northeast of the Luling field and about four miles east of Lockhart, where dry holes have shown the presence of a strong fault.

The San Antonio district was quiet in 1925. Southwest Texas had a fair amount of drilling, with no outstanding results. Old fields were extended and one new pool, in western Jim Hogg county, was indicated.

This territory has gone along quietly, being remote from centers of demand, but the extent of the work that has been done was indicated by Mr. Lahee's statistics. He said that on Dec. 1 there were in the Laredo district, which includes some 14 pools 408 producing oil wells, 38 producing gas wells, 47 abandoned gas wells and 290 dry holes.

Looking ahead: "The greatest leasing campaign and the greatest expansion of geological exploratory work have occurred in the area of the 'West Texas Basin,' especially in the counties from Garza and Kent southward to Tom Green and Irion and thence westward to Culbertson. As a result of this work many oil companies have opened offices in Fort Worth and San Angelo. Although many wildcats were drilled, yet, so vast is the territory involved, it has been barely scratched, as far as drilling is concerned. We may look for much in the way of development here during the year 1926."

The Oil Well Supply Co. took a prominent part in the Pittsburgh Chamber of Commerce's "Let's Know Pittsburgh" Week, Feb. 13 to 19, displaying a model drilling rig which attracted unusual attention.

Arkansas Possibilities

Dewitt T. Ring, consulting geologist, El Dorado, Ark., reviewed Arkansas and Louisiana. On Smackover, which caused the big excitement in 1925, he reported that the possibilities of the Blossom sand, which is the fourth—from surface—maior sand in the field, have not been fully determined and that beneath it, three more sands have been identified, but that not enough evidence is available on them to warrant speculation as to their possibilities. On new developments for Arkansas, he said:

"About 85 wildcat wells were drilled during 1925. Only two have shown any evidence of opening new territory. The Arkansas Fuel Oil Co.'s Allen No. 1, near Bradley, Sec. 18-19-24, Lafayette county, was completed during November as a 15-barrel oil well at a depth of 2785 feet. The oil is 25° Be. gravity. Also, Spencer and Rhoades, Sec. 9-17-16, five miles northwest of the El Dorado field, have a 50-barrel well at 1922 feet subsea, from the Nacatoch sand. The gravity of the oil is 31° Be. This well ..... may be the forerunner of a separate field.

"While it is true that prospecting in the usual pay horizons of the Upper Cretaceous has eliminated much territory in the Arkansas-Louisiana district, there still remains expectations of finding other shallow pools. Prospects for finding production in the Trinity formation of the Lower Cretaceous are rather encouraging. Where structures in the Upper Cretaceous have been proved by production there seems to be a desire to test the Trinity, especially where there is reasonable expectation of finding it within drilling depth of 5000 feet or less. This does not apply to wildcat structures."

Of Louisiana outlook: "At Cotton Valley the Palmer Trust Corp. has a deep well, located on the high part of the structure, that recently encountered six million feet of gas at 4419 feet. It is probable that this is the equivalent of the upper Glen Rose horizon of Pine Island. If this is correct, the horizon of the 3600-foot gas sand of Pine Island is probably at about 5000 feet in the Cotton Valley field. It does not seem likely that any important production of oil would be encountered above 5000 feet at Cotton Valley.

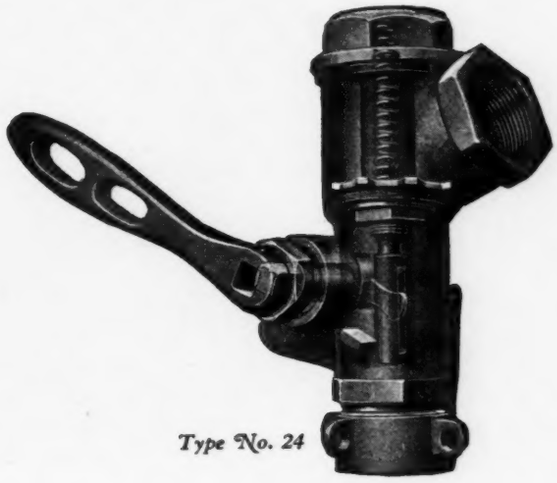
"Probably the first sand of real possibility below the present producing zone lies below a mile deep. This is only speculative, however, with little concrete evidence to indicate a sandy horizon being present at this depth. The Woodbine is reported to have had no showing of oil or gas, but carried salt water in the deep well of the field .....

"Wells are being drilled in Pine Island with the hope of finding a sand series below the 3600 gas horizon. The Dixie Oil Co. is the most active in this new quest. This company's Robertshaw No. 53, located in Sec. 13-21-15, came in on Dec. 6 from 3903 feet, making eight to ten million cubic feet of gas and 50 barrels of 39° gravity oil.

"The Gulf Refining Co., and the Dixie are drilling deep tests in the Bull Bayou field of the Red River-DeSota district. .....Although the Blossom sand has been producing at Haynesville for four years, the Woodbine horizon has never been penetrated at a favorable structural location."

Discussing Urania, LaSalle parish, Louisiana's newset field, Mr. Ring mentioned a recent completion, about a mile and a half ahead of production, a producer of the usual type (10 to 75 barrels daily in the others from 1450 feet subsea, 21 to 22° Be. oil). The extension well is about 20 feet higher structurally

Type A



Type No. 24

Standardize on One of These Two Tank Faucets

HERE are two Wheaton tank faucets, both of which give 100% satisfaction. Some companies standardize on Type A while others standardize on Type 24. Each faucet has only one peer—*and that's the other!* More important than a choice between them is a definite and final decision to *standardize* on one, and then forget for all time that there is any other faucet.

A. W. WHEATON BRASS WORKS, NEWARK, N. J.

Wheaton

than wells of the original group and may mean the getting onto another structural high.

New tests will be drilled on the west flank of the Monroe gas field in search of oil, Mr. Ring said.

Prediction: "Although predicting future oil production is a matter of conjecture, barring the discovery of new productive areas the only sources from which production may be increased are found in the deeper untested sands on the known structures now producing from shallower sands. In the Arkansas district, 1926 production will be considerable less. Louisiana will show a smaller actual percentage of decline. Total production will continue to fall off even though there is much drilling. Judicious wildcatting should undoubtedly result in the bringing in of new pools of value to both states."

Wyoming production in 1925 showed a 26 per cent decline from 1924, reported Fred E. Wood, of the Midwest Refining Co., Casper. The entire Rocky Mountain region fell off 15 per cent.

Four fields were added to the list of producing pools in 1925. These were Lake Creek, a structure in west central Wyoming; Table Mesa, New Mexico; Thornburg, a gas field in northern Colorado; Tow Creek, oil field in northern Colorado.

Another recent development was the finding of large gas volume at Rangeley, northwest Colorado. In Montana, Kevin-Sunburst greatly increased its production.

Prospects for Rocky Mountain

The outlook, according to Mr. Wood, is as follows: "..... it appears safe to say that the present fields with the drilling campaigns which are planned should not decline much over 10 per cent of the 1925 production. To predict what new fields will be productive is a rather hazardous undertaking, and rather than make specific forecasts, which would undoubtedly be wrong in part at least, it seems best to make the general statement: that there are likely prospects in this western territory, that some areas heretofore untested will develop new fields, as well as the discovery of deeper sands in old fields.

Black Mountain: First well was drilled in 1923. Three wells started in 1924 and 1925 and all finished last year as producers of 200 to 300 barrels of heavy oil, Embar and Tensleep sands. Field has no pipe line and wells are shut in.

Lake Creek: Not yet exploited. It is the first new find in Wyoming since 1923. The Embar horizon supplies the oil, which is of the black variety. Structure closely held by Union Oil Co. of California.

Lance Creek: Production increased in latter part of 1925 due to completion of a well in a member of the Dakota lower than previously had produced. Two offset wells were deepened as a result, both finding production.

Salt Creek: As usual, the state relied on Salt Creek, its one major field. In 1925, 460 wells were completed, including some 16 in the Lakota sandstone, deeper production than that which is now exploited. The Frontier sands—first and second Wall Creek, with a few in the so-called third Wall Creek—performed substantially, due to putting wells on the pump. Most of the Frontier sand wells in the field are now pumped. The Frontier sands ..... "appear to be on a slow decline basis but a gradual drilling campaign will partially offset this and these horizons should practically maintain their present production of oil for several years. ..... One of the Lakota wells was deepened and is now producing 25 barrels of oil per day from a sand in the Sundance formation. As there is considerable acreage structurally above this well, deeper tests at higher structural elevations may develop some interesting rsults."

Wellington Area Increased

In Colorado, development was continued at Fort Collins and Wellington. The Fort Collins part of this field contributed four wells which extended the productive area to the north and west. Wellington had three completions, definitely establishing that there was oil below the heavy gas first found, changing the conception of the field's geology. The areal extent of the pool is now proven larger than was anticipated.

Moffat field, northwest Colorado, was extended to the south and east. Five wells are now producing.

In New Mexico, Artesia district called for most of the work and 90 producers were completed therein. Table Mesa, one of the numerous small structure in northwest New Mexico, started off with a 300 barrel well, 57 gravity oil, got another in November good for 500 barrels and another is drilling. Rattlesnake dome, which produces the 65 gravity oil, is now getting a deep test, the Pennsylvanian being the objective.

Montana's Kevin-Sunburst field rose to position of second importance in the Rocky Mountain district. It reached a high mark of nearly 18,000 barrels daily.

Fields of the Mississippi Valley region, including Illinois, Indiana, western Ohio, western Kentucky and Tennessee, saw several developments of only local importance. In Illinois, about 1000 acres of new productive territory, principally in Wabash county, were added. Several wells had initial productions of 500 barrels, some of them flowed.

Some minor extensions of producing territory were made in southwest Indiana. Tennessee should, in 1926 show results from the drilling campaign in Scott, Morgan, Jackson and Clay counties, according to the estimates made by Gail F. Moulton, of the Illinois state survey; Hugh D. Miser, state geologist of Tennessee and W. N. Logan, state geologist of Indiana, who joined in presenting the report on Mississippi Valley fields. They see prospects of an increase in production for the region as a whole in 1926.

The Appalachian fields had little that was new in 1925, although a notable gain was made in the increasing of production from old fields by water flooding, use of air drive, which resulted in a gain for the region as a whole.

Dallas Oil Men Honor Pew at Luncheon

HOUSTON, Feb. 20.—J. Edgar Pew, vice president and general manager of the producing division of the Sun Oil Co., with headquarters in Dallas, was the honor guest at a luncheon Feb. 16, when about 60 representatives of the petroleum industry gathered at the Dallas City Club. W. H. Francis, general counsel of the Magnolia Petroleum Co., was toastmaster.

Mr. Pew, who recently retired as president of the American Petroleum Institute after a year's service, spoke briefly. Capt. J. F. Lucey of the Lucey Petroleum Corp., Dallas, addressed those present regarding a movement for regular monthly luncheons by members of the oil industry at Dallas. His plan was unanimously decided upon and he was named chairman for the initial luncheon.

Drilling Operations in Oklahoma, Kansas and North Texas

	Week Ending Feb. 20					Week Ending Feb. 13				
	Loc.	Rigs.	Drg.	S.D.	Total	Loc.	Rigs.	Drg.	S.D.	Total
OKLAHOMA										
Burbank	1	2	15	...	18	...	5	12	...	17
Other Osage	3	13	47	11	74	2	7	44	13	66
Bristow-Cushing	32	40	168	31	271	30	32	166	29	257
North Oklahoma	8	25	148	11	262	11	32	139	87	269
South Oklahoma	16	30	130	41	217	19	30	126	40	215
Muskogee	...	14	46	11	71	...	14	44	11	69
Okmulgee-Bristow	3	54	103	34	194	2	45	100	33	180
Tonkawa	...	1	5	1	7	1	1	4	1	7
Wewoka-Cromwell	11	25	102	23	161	16	17	101	27	161
Total Oklahoma	74	204	764	233	1275	81	183	736	241	1241
KANSAS	73	95	271	135	574	68	101	230	135	534
NORTH TEXAS										
Eastland County	...	2	43	4	49	...	2	39	5	46
Stephens County	...	15	30	15	60	...	19	31	12	62
Texas Panhandle	...	37	61	17	115	...	29	59	15	103
Mexia District	...	1	1	4	6	...	1	6	1	8
E. Texas Wildcats	...	7	7	13	27	...	3	8	12	23
W. Texas Wildcats	...	70	168	86	324	...	27	131	105	263
Wichita Falls	...	94	162	36	292	...	91	157	46	294
Total N. Texas	...	226	472	175	873	...	172	431	196	799
GRAND TOTAL	147	525	1507	543	2722	149	456	1397	572	2574

Gulf Coastal Region is Now Yielding Results on Deep Test Wells

By Paul Wagner
N. P. N. Staff Writer

HOUSTON, Feb. 20

PURE OIL CO.'S second test at Sweet Lake, about 12 miles south of Lockport development of the Vacuum Oil Co., is yielding the deepest oil production in the Gulf Coastal region of Louisiana. Oil has been standing in the hole at 5208 feet and at the time this was written the well was rated a 150-barrel pumper.

The first test of the Pure Oil Co. on the Sweet Lake prospect was a gasser, showing at 4500 feet several months ago.

In Gulf Coastal Texas, the only important development of the week was the Atlantic Oil Producing Co.'s No. 1 Taylor test, on the south side of the Boling salt dome in Wharton county. This well was running wild after blowing out under tremendous gas pressure at approximately 3000 feet. It was making an unmeasured quantity of oil along with the gas and was estimated probably good for 1500 barrels when brought under control.

The Atlantic well, located about 300 feet from The Texas Co.'s south flank discovery at Boling, got the gas nearly 200 feet higher than in the earlier completion. It is considered to be located near the edge of the caprock formation and perhaps up on the dome itself rather than down the flank.

An important showing for a new producing horizon in the Wilbarger county area was the finding of oil saturated lime formation in the D-4 Waggoner test of the Landreth Production Corp., in H&TC Block 4, Sec. 42, near the center of shallower development.

The Landreth test, still pending completion, picked up the oil saturated lime horizon at 2583 feet, nearly 300 feet deeper than lowest earlier productive levels in the Wilbarger development area. It will be closely watched because of possible proving a pay level

(Continued on page 55)

Completions in North Louisiana and Arkansas, Week Ended Feb. 18

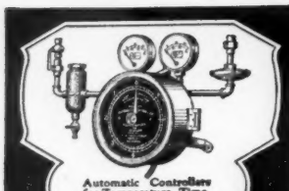
Company	Well	Location	Depth	Yield
Louisiana—Bossier-Bellevue				
Bliss et al	Fee A-9	15-19-11	420	10
Caddo Parish—Caddo District				
M. J. Brascher	Files No. 1	10-20-16	2270	60
Double II Oil Co	Spell No. 6	15-21-15	1701	65
Odell & Lawton	Huckaby No. 6	15-21-15	1715	20
Webster Parish—Cotton Valley				
Fortuna Oil Co	Ira Cox No. 20	23-21-10	2689	s.w. aband.
LaSalle Parish—Urania				
J. F. Cox et al	Tallos No. 1	25-10-1E	1541	150
Explorers Oil Corp	Gaharan No. 1	25-10-1E	1539	200
Hamilton et al	Bennett No. 1	25-10-1E	1541	500
W. W. Hawkins, trustee	Price No. 1	25-10-1E	1539	175
Nat. Gas & Fuel Corp	Tallos No. 7	25-10-1E	1297	s.w. aband.
Ohio Oil Co	Urania No. 2	14-10-1E	1590	s.w. aband.

Company	Well	Location	Depth	Yield
Catahoula Parish				
Ferguson & Kimbrough	Nichols No. 1	35-9E	2220	dry aband.
Marion County, Texas—Caddo District				
Atlantic O. & P. Co	Sedberry No. 1 M. G. Noll HRS		2375	125
ARKANSAS				
Smackover				
Magnolia Pet. Co	Betty Claudson No. 2	35-15-17	2995	s.w. aband.
Imperial O. & G. Co	McClannahan No. 9	6-16-15	2562	75
E. M. Jones	Murphy No. 1	17-16-15	2508	150
E. M. Jones	Murphy No. 8	17-16-15	2500	250
Lion O. & R. Co	Murphy D-5	8-16-15	2455	100
O. G. Murphy	T. C. Murphy No. 4	9-16-15	2475	50
Owens et al	Parks No. 1	32-16-16	2595	junked ab.
Rowe-Daniels Pet. Co	Tatum No. 11	7-16-15	2400	50
Simms Oil Co	Dumas A-1	9-17-16	2075	50
Bostick Drilling Co	Hodges No. 2	12-16-17	2295	20

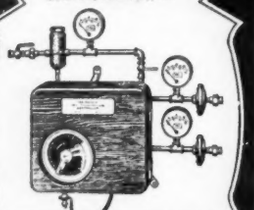
Completions in North and Central Texas, Week Ended Feb. 20

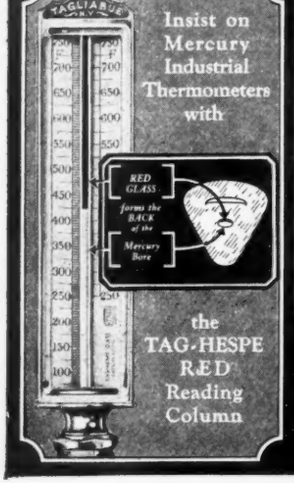
Company	Well Farm	Location Survey	Depth	Initial Prod.
Archer County				
Pandem	1-Jackson	Denton	1811-1814	30
Waite Phillips	11-Wilson	Howard	1718-1720	75
W. Phillips	12-Wilson	Howard	1706-1709	72
W. Phillips	13-Wilson	Howard	1707-1710	72
Muse-Robertson	2-Jackson	Aldridge	1535-1539	10
W. Phillips	38-Wilson	BBB&C	1523-1526	75
Consolidated	1-Coody	Harris	1166-1175	10
Harris et al	1-Oldham	Hubble	1037-1047	65
Harris et al	1-Trinity	TEL	1404-1410	40
Pandem	6-Cockrell	TEL	1429-1450	70
Pandem	7-Cockrell	TEL	1443-1448	50
American	5-Portwood	TEL	1401-1403	50
Gulf	5-Ware	Crawford	1265-1268	5
Empire	3-Wilson	ATNC	T.D.1753	Dry
Carter	1-Wilson	O'Reily	T.D.1640	Dry
Wichtex-Dixie	5-Jackson	Aldridge	T.D.1560	Dry
Texas	1-Dycus	Harris	T.D.1821	Dry
Simms	1-Tuber	Dallas	T.D.1619	Dry
Simms	2-Tuberville	Jefferson	T.D.1246	Dry
Pet. Prod.	1-Anderson	SAR	T.D.1403	Dry
Stanley et al	1-Herron	Beason	T.D.1254	Dry
Darlick	8-Darlick	TEL	T.D.1436	Dry
Hunt-Seigler	1-Cross	TEL	T.D.1430	Dry
Brown County				
Canyon	1-Koening	Comal	T.D.1708	Dry
Carter	1-Jones	Delgado	T.D.1200	Dry
Inland	1-Arant	Viser	T.D.1660	Dry
Hart et al	1-Brooks	Hernandez	T.D.1250	Dry
Stone et al	5-Gunn	Smith	1211-1220	25
Callahan County				
Cranfill-Reynolds	1-Cent Ad.	Anderson	1438-1450	15
Brannon-Murray	2-Cent Ad.		1447-1454	80
Kirk-Brewer	1-Mathis	Anderson	T.D.1500	Dry
Brannon-Murray	1-Cent	Knight	T.D.1470	Dry
Coleman County				
McLester	1-McDermott	Bates	T.D.2700	Dry
Merry	1-McClellan	McDonald	T.D.1610	Dry
Gwinnup et al	2-Dibrell	Hicks	1870-1885	85

Company	Well Farm	Location Survey	Depth	Initial Prod.
Collin County				
Hartwell	1-Anderson	Neal	T.D.3000	Dry
Eastland County				
Texas	1-Bivens	H&TC	T.D.1900	Dry
Pitzer et al	1-Martin	Lloyd	T.D.3556	Dry
States	6-Shahan	Shahan	1909-1921	10
States	6-Hise	H&TC	T.D.3472	Dry
Hutchinson County—Panhandle				
Crosbie et al	1-Pitts	TC RR	2860-2866	6
McIlroy	2-Smith	M&C	T.D.2985	500
Montague County				
Texas	5-Gist	Donoho	930- 941	35
Palo Pinto County				
Ocheltree	1-Hickson	T&P	T.D. 676	Dry
Reagan County				
Texon	1-Univ.	University	....	Dry
Big Lake	23-Univ.	University	2450-2473	75
Big Lake	54-Univ.	University	3065-3070	2600
Big Lake	33-Univ.	University	2906-2979	613
Texon	33-Univ.	University	2915-2932	535
Texon	37-Univ.	University	3062-3091	45
Stephens County				
Gulf	2-Beyer	TP	2644-2653	60
Tex-Pac	8-Veale	TEL	3880-4050	25
Landreth	1-Guest	TP	T.D.4125	Dry
Wilbarger County				
Milhan	1-Waggoner	H&TC	1808-1818	40
Humble	5-Waggoner	H&TC	1859-1880	65
Humble	6-Waggoner	H&TC	1884-1901	30
Landreth	3-Waggoner	H&TC	1874-1888	15
Milham	1-Waggoner	H&TC	1920-1928	50
Young County				
Nash-Windfohr	4-Lamator	Morris	2432-2460	65
F. H. E.	2-Dunagan	TEL	1024-1029	10
Reed-Anderson	1-Gragg	TEL	T.D.1000	Dry
Consolidated	1-Lassiter	TEL	T.D.1256	Dry



Automatic Controllers for Temperature, Time, Pressure, Humidity, etc.





Insist on Mercury Industrial Thermometers with

the TAG-HESPE RED Reading Column

TAG

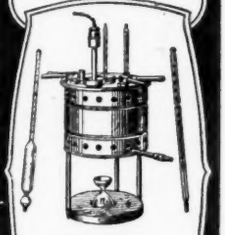
Announcement

BRIEF, authoritative, discussions of the principal tests for petroleum products will appear in this space every two or three weeks. They will treat of Gravity, Color, Viscosity, Cloud and Pour, Distillation, Carbon Residue, Flash Point, etc. ¶ They will affect all buyers and sellers of petroleum products who are interested in standardization of tests. ¶ The first of these short talks—to appear in this space March 10th—will be on GRAVITY. ¶ As makers of official oil-testing instruments since oil-testing began some sixty-five years ago, we have reason to believe that the publication of these messages, in the guise of advertising, will do real good.

References will naturally be made to the standard instruments, and it will be well to prepare yourself by sending for a copy of the TAG Oil-Testing Instrument Catalog, No. N-699.

Recording Thermometers, Pressure Gages, etc.

Dial-Indicating Thermometers



Oil-Testing Instruments, Laboratory Thermometers, Hydrometers etc. etc.

TAGLIABUE MFG. CO.

C. J. TAGLIABUE MFG. CO.

18 to 88 Thirty Third St., Brooklyn, N.Y.

Fig. 106
Screwed, Jenkins Standard Bronze Globe Valve

Fig. 325
Screwed, Jenkins Standard Iron Body Gate Valve

Hard work agrees with a Jenkins Valve

A Jenkins Valve is a "husky." It's built to stand plenty of work, and hard work, too.

Made from analyses-proved metals, each is made and tested with typical Jenkins thoroughness. Jenkins Valves for practically every equipment—at supply houses everywhere.

JENKINS BROS.

80 White Street . . New York, N. Y.
524 Atlantic Avenue . . Boston, Mass.
133 No. Seventh Street . Philadelphia, Pa.
646 Washington Boulevard . Chicago, Ill.
JENKINS BROS., Limited
Montreal, Canada . . London, England

Always marked with the "Diamond"

Jenkins Valves

SINCE 1864

"Oil Land Development and Valuation"

by R. P. McLaughlin

Petroleum Engineer and Geologist, formerly State Oil and Gas Supervisor of California.

It Tells you:

- How to locate and space oil wells properly;
- Methods of drilling wells;
- How to test wells;
- How to gauge output of wells;
- How to use production reports;
- How to repair wells;
- How to deepen wells;
- Rules for abandonment of wells;
- Methods of shooting wells;
- How to evaluate oil wells;
- Examples of repair work at oil wells;
- Examples of efficient development of a new field.

200 pages, pocket size, flexible, 59 illustrations
$3.00. Check with order.

For sale by

National Petroleum News

817 Caxton Bldg.-Cleveland, Ohio

hitherto unknown in the Greater Wichita Falls district.

A well making non-inflammable gas, commonly referred to as "cold air" in the field, has been completed at 1250 feet by the Rio Grande Oil Co., in southern Scurry county, on its Carey lease. The well is about 1000 feet from the Moore completion of the Northwest Co., which has long been utilized for power under a hook-up peculiar to oil country practice.

The gas flow, found in lime formation at 1296 feet in the discovery well, analyzes about 93 per cent nitrogen. It shows a trace of helium, but not enough for commercial extraction.

As the gas shows a rock pressure of about 200 pounds per square inch, efforts were made to utilize it, resulting in the "cold air" from the original well being bradenheaded and turned into boilers for use instead of steam. The arrangement also includes a boiler half filled with crude oil to arrest sand or other particles which might come out of the well and an equalizer and blowoff valve on the gas line from the well. The "cold air" is said to turn the engines quite as well if not better than steam. Expansion of the gas in the cylinders and the exhaust pipe produces a cooling effect not unlike that of ammonia in ice factories.

The Northwest Co. has drilled a half dozen test wells in southern Scurry county with "cold air" power and pumps four producing wells with it.

Major companies operating in the southwest are leasing extensive acreage in the East Texas territory, about midway between the Mexia-Powell fault zone and the Louisiana state line. The Gulf, Pure, Humble and Magnolia companies are all large leaseholders around the Colliton et al test in Cherokee county, where more than a year ago a showing of oil was found at about 3500 feet. Another test drilled by Colliton et al on the Payne farm has been abandoned at 3030 feet, because of a bad fishing job, but derrick is up on the Clapp tract for a rotary hole.

In Anderson county, the Humble has leased approximately 190,000 acres from the Southern Pine Lumber Co., in scattered blocks along the Neches river. Some of this acreage extends over the line into Cherokee county. Core-drill tests are being made to the Midway lime horizon at a depth not made known.

Completions in Oklahoma and Kansas, Week Ended Feb. 20

OKLAHOMA

Company	Well No.	Location	Depth	Initial Production
Carter County				
Skelly	1	C SE NE NW 21-2-3W	T.D.3986	Dry
Creek County				
Grieves	1	NEc NW 24-19-8E	3025–3055	50
Bu-Vi-Bar	1	NEc NW SW 11-17-8	2595–2613	3M
Alvard-West	1	SEc NE SW 14-17-8	2257–2302	140
Madden	1	NWc SW SW 31-18-10	2347–2380	35
Terrell et al	1	SEc 4-18-11	1889–1902 OWD	10
Prairie	7	SWc NW NE 4-16-12	1685–1723 OWD	½M
Carter	2	NWc SE 22-16-8	T.D.3736 OWD	Dry
Wright	3	SWc NE NW 25-17-10	T.D.3327	Dry
Garfield County—Garber				
Sinclair	24	C NE SE NE 13-22-4W	4230–4281	5750
Sinclair	28	C NW SE NE 13-22-4	4255–4321	5055
Imo	5	CWL NE NW 31-22-3	2193–2212	150
Hughes County—Papoose				
Gypsy	1	C NE SE SE 27-9-9E	3310–3327	738, 12M
Carter-Sands	4	C NW SW SE 1-9-9	T.D.3396	Dry
Ark. Fuel	1	C SW NW NE 26-9-9	T.D.3485	Dry
Hughes County—Wewoka				
Champlin et al	1	C NE NW SW 24-8-8E	T.D.3302	Dry
Kay County				
McComas	1	C NE NE SW 24-27-1W	T.D.4230	Dry
Golconda	1	SWc NW 29-27-2W	T.D.3874	Dry
Blackwell	1	SEc NW 8-27-1W	3483–3491	110
Kay County—N. Braman				
Comar	7	NEc NW SW 21-29-1W	2051–2081	104
Kay County—Thomas				
Marland		C SW SW SW 15-25-2W	2063–2150 OWD	10
Lincoln County—Davenport				
Gypsy	6	SEc 35-15-5	3408–3437	30
Amerada	1	NWc NE SE 2-14-5	3317–3372	896
Magnolia	15	NWc NE SW 2-14-5	3279–3374	325
Skelly	4	SEc SW NE 2-14-5	3274–3325	350
Texas	3	NEc NW SE 2-14-5	3273–3370	300
Gypsy	4	NEc NW 11-14-5	3320–3384	860
Okfuskee County				
Burns	1	NEc SE NE 12-12-10	2711–2718	288
Keaton-Gold	2	CEL NE NE 14-12-11	2567–2573	40
Windsor	3	SEc 15-11-11	2030–2092	20M
Fisher-Carter	1	SEc 7-10-12	1785–1812	120
Detrick-Dixie	1	SEc 1-13-10	T.D.3342	Dry
Dow	1	SEc NW 14-12-11	T.D.3600	Dry
Windsor	1	SEc SW NW 15-12-11	T.D.2600	Dry
M. K. I. P.	15	NEc NW SE NE 36-12-11	T.D.3325	Dry
Okmulgee County				
Nowata	3	SEc NE SE 4-15-11	1912–1930	15
Pine	7	NWc NE NW 18-15-13	2703–2711	50
Transcontinental	1	SWc NW 3-15-14	1498–1501	9M
Papoose	6	SEc SW SW 11-14-14	1780–1786	20
Calahan	2	CNL SE SW 15-13-14	1618–1650	40
Roxana	4	NWc SW SE 15-13-14	2435–2445	250
Sturdivant	1	NWc SW SE 1-11-13	T.D.3074	Dry
Lambert	2	SEc NW NW 20-13-15	1020–1037	¼M
Booch et al	1	NEc SW NE 15-15-12	T.D.2876	Dry
Magnolia	1	C SW NW 4-12-12	T.D.3920	Dry
Pulaski	1	NWc 33-15-14	T.D.2287	Dry
Invader	15	NWc NE SW 16-14-13	T.D.2943	Dry
Rebold	3	SEc NE 16-13-14	T.D.2525	Dry
Shelton	1	SEc NE SW 20-13-15	T.D. 850	Dry
Osage County				
Owen Osage	357	SWc NW SE 22-28-10	T.D.2173	Dry
Northland	66	SEc SW SE NE 32-26-12	T.D.1635	Dry
Superior	1	CEL W½ NE SW 29-20-11	T.D.2499	Dry
Beacon	7	SWc NE SW SE 27-29-11	976–1030	60
Ind. Terr. Ill.	1	SWc NW 2-28-11	955– 980	4
Ind. Terr.	338	SWc NW SE NE 27-25-11	1220–1238	100
Peters	4	SWc NE SW NE 32-24-9E	1477–1592	15
Peters	7	SWc SE NW SE 12-23-8	2097–2155	75
Calvin-Belt	6	SEc NW SE 5-20-11	2383–2426	30
Winona	3	SEc NE 29-20-12	1965–1972	200
Osage—Burbank				
Phillips	16	NEc SE 2-27-5	2934–2967	3150
Pawnee County				
Privett	1	NEc SE 3-20-6	2993–3026	7½M
Magnolia	4	NEc 21-20-6	3109–3117 OWD	265
Sinclair	5	SWc NE 10-20-8	2572–2586 OWD	90
S. W. O. F.	18	CWL SW NW 24-20-8	2743–2752	65
Sinclair	1	NWc NE 27-23-4	T.D.3285	Dry
Stein	1	NWc NE NE 21-20-7	T.D.2945	Dry
Payne County—Mehan				
Mulberry	2	SEc 31-18-4E	3612–3647	15M
Shaffer	15	NEc NW NE 2-18-5	3407–3450	50
Pontotoc County				
American	2	SWc NE NE 17-4-6	T.D.2170	Dry
Lloyd-Smith	1	NEc SE NW 6-3-7E	T.D.1272	Dry
Seminole County—Wewoka				
Dixie	4	C NW NE SE 31-8-8E	3844–3850	10
Ramsey	1	C NE SE SE 31-8-8	3973–4065 OWD	50
Magnolia	3	C SW SW SW 32-8-8	4070–4071 OWD	2500
Berry	1	C SW NW NW 8-9-8	T.D.3408	Dry
Tulsa County				
Frates	5	SWc SE NE 1-17-14	1297–1314	45
Holmes et al	1	CNL NW SE 22-19-10	T.D.2154	Dry
Hall-Dozier	2	NWc SE SW 1-17-14	T.D.1410	Dry
Wagoner County				
Sewell	2	NWc SE 25-17-16	1292–1309	40
Metzger	1	SWc SE SE NW 35-17-16	T.D.1521	Dry

KANSAS

Company	Well No.	Location	Depth	Initial Production
Butler County				
Travis et al	6	C NE NW 11-27-5E	2695–2706	10
Empire	161	CNL S½ S½ NW 27-26-7	2719 T.D.	Dry
Brennon et al	2	NEc SW SW 27-26-7	T.D.2719	Dry
Chase County				
Dinges et al	1	NEc SW 23-22-9	T.D.2537	Dry
Clark County				
Watchorn	1	SEc NE NE 20-32-21	T.D.5679	Dry
Cowley County				
Ark. Fuel	1	SWc 20-30-4E	T.D.3400	Dry
Elk County				
SW Gas	11	NWc NE NE 14-31-10	1338–1350	75
Neeley	1	SEc 20-31-10	1542–1555	30
Kans-Cent	1	C E½ NE SW 16-31-9	T.D.1472	Dry
Litterl et al	1	SWc SE NE 9-31-10	T.D.1587	Dry
Theta	2	SWc NW NW 26-31-10	T.D.1411	Dry
Anderson	4	C SW SE 16-31-9	1458–1568	4½M
Greenwood County				
Texas	3	SWc NW SW 29-22-10	2406–2430	180
Phillips	4	CEL SE SW 33-22-11	1895–1938	100
Davis et al	1	SEc NE SW 24-23-8	2595–2630	50
Mission	7	NWc SE NW 25-23-8	2520–2538	100
Haverhill	4	SEc 4-23-13	1580–1604	20
Simmons et al	3	CEL NE NW 19-22-11	T.D.2205	Dry
Phillips	4	NEc NW NE 30-22-11	2295	Dry
Tidal	2	SWc NE SW 10-23-9	T.D.2468	Dry
McGinnis et al	2	SWc NE 30-24-11	T.D.2025	Dry
Natl. Ref	1	SEc SW SW 11-25-9	T.D.2700	Dry
Empire	1	C NE NW 24-27-8	T.D.1260	Dry
Lyons County				
Fisher	1	SEc NW 9-21-13	T.D.1831	Dry
Marion County				
Empire	1	SEc 22-18-5	T.D.2350	Dry
Connell et al	1	SWc NE 14-21-4	T.D.2607	Dry
Sheedy et al	4	NWc NE 24-21-4	2397–2399	125
Rice County				
Prairie	1	NEc NW SW 35-20-6	3385–3460	176

Corrosion of Pipe Lines and Methods Of Protectively Covering

By F. Ray McGrew
Vice President and General Manager, Standard Pipe Line Co., Inc.

Delivered Before Petroleum Division, A. I. M. E., New York, Feb. 15-17.

The accompanying paper by Mr. McGrew, of Shreveport, was presented at the group meeting on transportation, Petroleum Division, A. I. M. E. in New York, Feb. 16. The author speaks from the standpoint of one who has long been engaged in the pipeline business in a territory where corrosion problems are pronounced.—Editor.

THE loss due to the corrosion of metals in the industries of the United States has been variously estimated at from $200,000,000 to $350,000,000 per year. A large percent of this loss is suffered by those metals which are used underground. Much of this loss is in the actual decay of the metals, but a large amount represents expenditures for various kinds of protective coatings, from which there is little or no benefit realized. The figures given apply to industry generally, but when we consider the loss by corrosion to pipe lines only, then the problem becomes more serious.

The reason for this is plain, for in this industry approximately 65 per cent of the total capital investment is represented by underground metal lines, which are subject to the most severe corrosive action. A great amount of time and an enormous amount of money have been spent in an effort to develop a satisfactory protective coating for pipe lines.

Point of View

In my opinion, this has always appeared to be a wasteful expenditure of effort and the wrong point of attack. We should not study how to protect an inferior pipe but should try to find out how to make a metal that will resist corrosive action. The pipe line companies and other large users of metal pipe for underground service should demand from the manufacturers material which would meet their service efficiently. So long as the industry is content to use pipe as presently manufactured, just so long will manufacturers be content to make for us the unsatisfactory pipe now in use.

Pipe line deterioriation cannot correctly be described in the broad term "corrosion" for the reason that lines in underground service do not only corrode, but they also pit. Pitting, with reference to pipe lines, means rapid corrosion in particular spots. Corrosion, generally speaking, is taken to mean rusting. Webster says: "Corrosion: The action or effect of corrosive agents, or the process of corrosive change; as, the rusting of iron is a variety of corrosion."

As to the cause of corrosion of metals, there are many theories. Of these ideas, three may be considered important, to-wit: acid, electrolytic, colloidal. Space does not permit any attempt to explain these theories. The real cause of corrosion must first be learned before pipe satisfactory to the industry can be manufactured. It is the writer's opinion that the chemists have come nearer finding an effective protective coating for underground lines than the manufacturers have come to finding the cause of corrosion and a manufacturing method to prevent it.

Corrosive action on pipe lines underground is not uniform. If the corrosion which takes place on pipe line underground was uniform, the situation would, at once, be a much reduced menace. In addition to the slight rusting which at once sets up on the new pipe line, there is an intensified corrosive action in particular spots called pitting. This is what gives the real trouble.

From the writer's experience in Louisiana, Arkansas and Texas, seven years may be considered the life of the average pipe line. I do not mean to convey the idea that a pipe line is entirely worthless after seven years, but, during that time, pit holes will be found extending entirely through the pipe, and the line to be 100 per cent reliable would require renewals at many places through-out the system. The conditions above described will not be confined to any particular class of soil. Neither will long sections of pipe have to be renewed, but here and there will be found a joint or portion thereof entirely pitted through and interspaced with sections of good pipe, coated only to the extent of the ordinary red rust. For the above reason, in a pipe line system that is in use, it is obvious that the pitted joints cannot be removed and renewed when found, but long sections of good and bad pipe must be removed at great expense. New line must be cut into service and the pipe that is removed must be culled and that which is good set aside for relay service.

Pipe Not Uniform

Taking into account only the uniform corrosion which appears on the surface as rust, pipe lines in underground service would last from 35 to 40 years without a protective coating of any kind before the strength and durability of the line would be affected to the point of interrupted deliveries. Pipe, as presently manufactured, is not homogeneous. This, I believe, is acknowledged by pipe manufacturers generally, and an analysis of specimens taken from lines which have been in service under the writer's supervision has shown this to be true. Does not this, then, lead to the question: If steel pipe were homogeneous, would not the corrosive action be uniform? This being true, would it not naturally follow that with uniform corrosion our problem would immediately cease to be one of great moment?

A great deal of discussion has been had concerning the adaptability of cast iron pipe for oil pipe line service. Nothing has been developed in the way of a satisfactory connecting joint and there are other engineering difficulties which present themselves and discourage the idea of its use for this purpose. Even though all of the engineering difficulties were satisfactorily solved, the writer is of the opinion there would be little advantage gained, for the reason that while cast iron pipe may be more rust-resisting, it will flake and develop graphitic softening. This condition is not apparent from casual observation, and for this reason a serious condition might develop in the lines, and entirely paralyze the plant before such condition was recognized to exist.

One Effective Method

To the writer's knowledge there is only one method of line protection that may be considered absolutely effective, one that will protect a pipe line indefinitely. This method is that of encasing the line in a concrete mass. Recent inspection of a line so protected 15 years ago, in territory where the normal life of a line is six to seven years, shows perfect preservation. No corrosion whatsoever has taken place. From this test, it would seem logical to conclude that there could be expected a like extension of the life of this line.

The concrete used on the line described above was a dense concrete, or roughly of 1 to 3 mixture, cement and sand, the above proportions being varied according to the quality of the sand. The porosity of the sand was tested and cement was used so as to completely fill the voids therein. It has been found from close examination that the moisture penetration into this encasement is about one-quarter of an inch. The concrete applied to the line was in the following thickness: Bottom 2 in., side 1½ in., top 1 in.

The use of the above method is limited. It would be good practice to use it only on lines of known permanency for the reason that the encasement must be

destroyed when the line is removed. In the pipe line business constant changing of lines is necessary on account of increased or decreased capacities; therefore, it would involve a very large economic loss should it develop that a pipe line so protected would have to be taken up, as this would necessitate the destruction of the encasement. The loss would not justify the advantage gained. It is also impracticable to use this method on a system of pipe lines removed from transportation facilities, as the materials necessary to its use are difficult and expensive to cross-country transportation.

Painting of Lines

The use of lead or zinc paints in vegetable or animal oil vehicles on lines undeground is a wasteful expenditure of money, as our experience shows there is no benefit whatsoever to be gained therefrom. Asphalt paints and coverings are used widely. Considerable benefits are claimed by some users of these processes, but in the writer's experience, which has been confined to soils of the saturated class, I find that no lasting benefit may be expected.

This method may give satisfaction in arid land where the soil contraction is nil, but in mucky or "buckshot" clays during dry periods there is a very great contraction. Result—the clay pulls away from the line and as the asphalt adherence to the clay is greater than to the pipe, it is pulled away from the pipe, leaving only the binder on the pipe surface, causing the seal to be broken. Water and moisture at once enter and the damage is done. We have found this true, regardless of the method of application. Where paper and wire wrappings are used the result is the same.

On account of the seriousness of the problem from the maintenance standpoint and the great expense and economic loss due to corrosion the writer has ever been on the lookout for an effective protective coating. In line with this attitude, in addition to the practical application of the more common methods in use, we have run actual demonstration tests of variously highly recommended patented paints and compounds seeking to develop their merits. It has been our experience that none of these tests have developed merit, except in one instance. In each case the coatings have either developed cracking, rapid disintegration, have disappeared, or lost oil content, leaving only a chalky substance on the surface of the pipe, under which the usual corrosive action immediately sets in.

Experience With No-ox-id

Not appearing in the role of a salesman but for the purpose of stating facts which may be of value to the industry at large, I wish here to state briefly our experience with no-ox-id compound, manufactured by the Dearborn Chemical Co. of Chicago, Ill. The readers of this paper may draw their own conclusion, as I do not make any recommendations. In November, 1922, there was applied to a section of new pipe line (open hearth steel) which was being laid at the time, a coating of no-ox-id. At the end of 18 months the first inspection of this line was made. No evidence of corrosive action was noted and the clay was not frozen to the pipe. The pipe surface was clean with ample no-ox-id on it giving the apperance of "duck-back" condition. The amount of no-ox-id on the line, from all appearances, remained the same as when applied (as nearly as could be observed). On three other lines at this point parallel to the line described. and which were unprotected, first renewals in six to seven years were necessary.

At the same time that the new line was protected another line immediately parallel to the above mentioned line, which had been in service for seven years and on which numerous renewals had been made, was given a coating of no-ox-id to determine whether or not it would arrest corrosion once it was well under way. This line was very badly pitted and at a great many points the pits had eaten almost entirely through.

At time of inspection (18 months after application) no corrosive action was noted in any form on the new line, and as well as could be detected from close observation corrosive action on the old line in the bottom of the pits had been arrested. It was also noted that on the new line, outside of the protected area, corrosion had set in with the usual progress. These lines have been carefully inspected at each six-month period since that time. The last inspection was made on Dec. 1, 1925, or approximately three years after the coating was first applied. There was no evidence of corrosive action and there was present on the surface of the pipe liberal quantities of the compound.

It was found that there was a slight shifting of the compound, in that, on the upper side areas of the pipe, the film had thinned up somewhat, but there was a like thickening of the film on the bottom and lower sides of the pipe surface. This is occasioned for the reason that the compound is of a non-hardening nature. In our experience with pipe line pitting, we find that the greater part of the corrosive action takes place in the lower one-third of the pipe circumference or even on a more limited section of the bottom of the pipe. Therefore a non-hardening protective coating which will shift to the lower areas of the pipe surface is a benefit, provided it still maintains a sufficient film on the upper areas to give the protection desired.

The cost of applying no-ox-id in our experience, material and labor, is comparable to that of applying an ordinary good grade of paint; therefore, since this method of protection has entirely protected a line for three years, (no corrosive action yet appearing) where the life of a line is from six to seven years, it would seem logical to expect considerable additional benefits from its use. As a rust inhibitive for pipe and warehouse stocks exposed to atmosphere we have found it has protected metals for seven years in a perfect manner. There can be no accurate forecast of its future efficiency, and we can only await the lapse of time to determine the answer.

Why Bury Lines

One of the great faults I have observed among men, generally, is their inability to take more than one view of a particular subject. We are all prone to get into a groove and stay there. A given object viewed from opposite sides often has a different appearance. The same mountain or landscape viewed in different sunlight often appears not to be the same. Following this thought, let us ask ourselves these questions. Is the present method of constructing pipe lines (underground) the best method? Could they not be placed entirely above ground? Is it not true that the only real reason for underground construction is that we started out using this method and have been following it ever since? I realize the mere suggestion of such an idea will be considered revolutionary by practical pipe line men everywhere, but, notwithstanding this, I am not so sure that a close study of the engineering features that will be suggested as obstacles which preclude the adoption of the method, there really are none that could not be solved.

Transportation Methods Are Reviewed

NEW YORK, Feb. 20.—This year the petroleum division A. I. M. E., in line with its plans for making the work of the division embrace all phases of the petroleum industry, held a symposium on transportation. Douglas S. Bushnell, long identified with pipe line operation and head of several systems, presided.

One paper of this symposium, that on corrosion of pipe lines, by F. Ray McGrew, is presented elsewhere in these columns.

J. H. Wiggins, engineer for the Chicago Bridge & Iron Co., best known as the Bureau of Mines man who conducted such exhaustive investigations into evaporation losses, well known also as the inventor of the Wiggins floating roof, prepared a paper on "Evaporation in Transportation and Storage of Petroleum and Methods of Prevention."

A general outline of the methods of transportation, pipe line, tank car, tank ship, was prepared by Charles Fitzgerald, of the Pure Oil Pipe Line Co., Dallas. This paper described the physical equipment used, dimensions and methods of operating.

Nelson B. Delavan, of the Goulds Manufacturing Co., Seneca Falls, N. Y., reported on the investigation conducted into the cause of breakages in crude oil pipe line systems. This study was made in both laboratory and field and while Mr. Delavan reported that the work is just well started, evidence has been obtained that study and experimentation may well be directed to what he called "pressure surges," as an important factor in the breakage of equipment.

Basic Changes In Refining Processes In Past Few Years

By Walter Miller
Manufacturing Manager, Marland Refining Co.

Delivered Before Petroleum Division, A. I. M. E., New York, Feb. 15-17.

THE remarkable strides which have been made in recent years in the art of petroleum refining are not fully apparent until we attempt to compare the scientic status of the industry today with the basic conditions existing a decade or so ago.

The spotlight has played so strongly on the development of the cracking art that many of the wonderful steps brought about in other departments have crept upon us unawares.

A number of causes have contributed to this highly accelerated rate of progress within the art. Constant effort by both companies and individuals to obtain the honors and prizes rewarding new discoveries has played its usual important part in our industry as in others.

Competition has applied its continuous pressure on the refiner to reduce costs and losses and increase the proportionate yields of the higher valued fractions.

Advance in Science Helps

Advances in the engineering professions and growth in chemistry and allied sciences have contributed much. But there are other factors which deserve particular mention. The rapid development of the internal combustion engine, with its rigorous quality needs and large quantity consumption of both fuel and lubricants has been a tremendous influence in adding impetus to natural progress.

The teaching of petroleum principles and practices in many of our best universities and technical schools, and the calling into the industry of ever greater numbers of scientifically trained men to supplement the efforts of the practically trained operators, as well as to apply at close hand the fundamentals of science as a life work, has had and is having incalculable influence.

Let us consider briefly some of the most important improvements: First, Distillation, which constitutes the greatest single phase of refinery operations, even with cracking excluded; that phase of distillation being handled as an individual subject in this symposium.

Distillation Rate Faster

Today we are distilling crude oil and redistilling by-products at a rate very much faster than was possible with the lesser knowledge of the art which we possessed years ago, at rates which in the most modern installations are two or three times that of former capacities.

Improvements in firebox conditions, making not only for greater efficiency but for considerably higher heat transfer rates through the fire-sheets are a factor in this increased capacity, with more progress still to be made.

One of the newest developments along this line involving much broader application of the principle of radiant heat, is known as the cannon furnace. Square shaped funnels between a foot and a foot and a half in width and height made of carborundum slabs, are placed in the combustion chamber with a separate burner for each.

The combustion takes place mainly within the tunnels, heating their walls to radiating temperatures. This type of furnace is being used now in a number of plants, some places experimentally and in others in a comparatively large way.

Heat Exchange Applied

The principle of heat exchange is being applied on a greater scale than ever before. While up to a few years ago heat recovery had been practiced in many European and foreign refineries to a greater extent than in the United States, higher fuel prices here and the development by engineering specialists of efficient and economic equipment is rapidly bringing about a greater use and realization of the value of this principle.

A comparatively new practice in this country is the application of internal flues to cylindrical stills: A considerable number of tubes from four to six inches in diameter in the lower half of the still, so spaced as to have them all below the normal oil level, allow the combustion gases to make another pass against the heating surface, on the well known principle of the return tubular boiler, adding to both efficiency and capacity.

This principle has been employed by many foreign refineries where high fuel costs obtained, the only difference being that one or two large tubes instead of twenty or thirty small ones, were generally used.

The various improvements in distillation methods on cylindrical still batteries have been stimulated by the competition of the pipe still, which has some advantages over old distillation methods and equipment. It is in connection with pipe still installations that the principles of vapor and liquid heat exchange have been developed to a high point of perfection. The radiant heat value of the gases of combustion have also been utilized to a larger degree on this type of installation. Many plants are being installed and it is now a well established factor.

Vacuum distillation which has had a limited application since the early beginnings of the industry and lay dormant until about 1920, has undergone a new development. While the old method was to operate under a vacuum of from 20 to 27 inches of mercury, a patented process now being used quite extensively in the manufacture of lubricants from asphaltic and naphthenic base crude oils, is operated at or near the zero of pressure that the guages show normal operating pressures of from three to seven millimeters absolute.

In addition to whatever refining advantages it possesses, the mere building of commercial equipment in which such high vacuum could be maintained constitutes a remarkable engineering achievement.

The reduced pressure enables the distillations to be carried on at temperatures well below the danger point of cracking. There are quite a few commercial installations, all of them, I believe, on asphaltic and naphthenic base crude operations, on which type of material the process has had its main success so far.

A much larger yield of the valuable lubricating oil fractions is obtained, and in addition the products themselves are of higher quality, and require much less chemical treatment and decolorization to finish.

It is difficult to say at this time to what extent this method will be applicable commercially to the making of lubricants from paraffine and semi-paraffine base crude oils, but its usefulness in the case of the other types of crudes mentioned seems quite well established.

Fractional Condensation Factor

The most important single factor in bringing about the present high standard distillation practice has been that of fractional condensation. Improvements in fractionating methods are secondary in importance only to the cracking plant in increasing the yield of gasoline from crude oil.

Elimination of the necessity of rerunning ability to operate stills at capacities limited only by possible heat transfer rates and resistance of materials, and a close separation materially raising both the quality and yield of the desired product or products.

One of the latest fashions in fractionation is the bubble tower. While

employed for generations past in the alcohol, benzol and allied chemical arts, it did not find application in the petroleum industry until within the last few years. Its superiority over many of the forms of towers already in use was so marked however, that it was quickly established on a very firm footing and is already in very wide use.

A still new thought in the process of development is the application of centrifugal force to the vapors. One line of investigation being pursued is that of a low centrifugal speed with a full complement of special plates, another the development of a comparatively high peripheral vapor velocity in a small chamber without the use of plates.

Still another outstanding example of the progress in the industry during the last few years is the improvement effected in the methods and equipment used in discolorization and purification of petroleum products.

It is not that new chemicals are being used. Nothing has yet been found to replace satisfactorily that old stand-by of the refiner, sulphuric acid. Aluminum silicate, to give Fuller's Earth its more scientific name, is today of greater proportionate importance than when it replaced the use of animal charcoal 20 or more years ago.

The substitution of the closed system of chemically treated gasoline for the old method of acid spray and air agitation in comparatively open top containers permitted a more intimate contact between chemical and hydrocarbon, closer control of the operation with less chemical expense, and principally, reduced evaporation losses to practically zero.

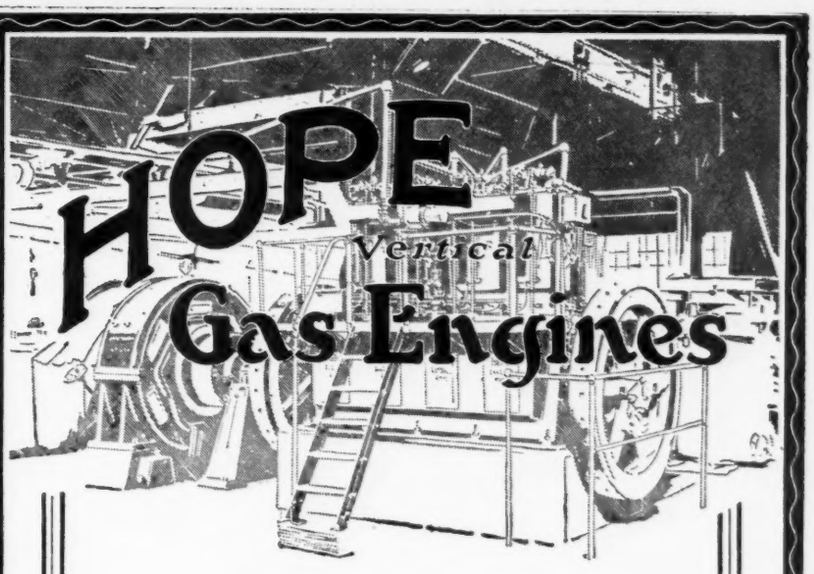
The lessened chemical required in turn reduced the losses both in the form of sludge and polymerization, the latter being a very considerable item, especially in the case of cracked products.

Vapor Phase Treating

Vapor phase purification is one of the newest commercial developments in treatment of gasoline of the cracked type. It must be remembered in this connection that the industry has been seeking for a score of years to develop a practical and economical chemical purifying process which could be applied to the gasoline fraction without the necessity of subsequent re-distillation. So far we have been unsuccessful.

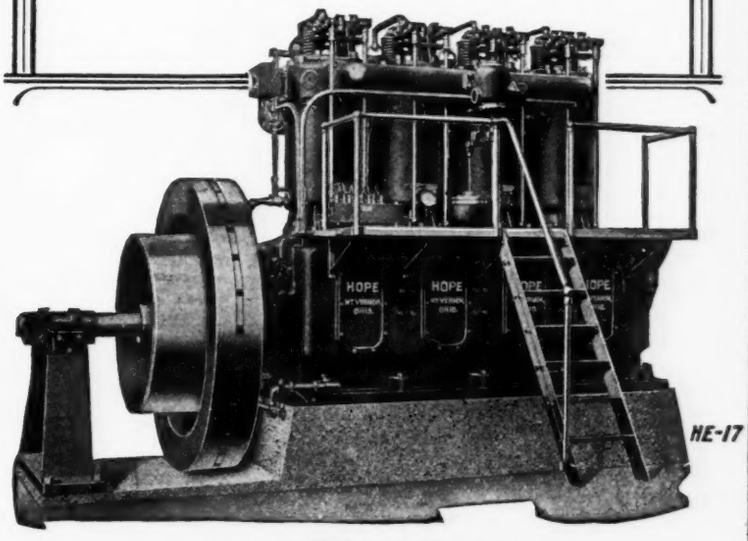
We still find that the unsaturated gasoline fractions when brought in contact with sulphuric acid, besides suffering excessive sludge and polymerization losses, form sulpho compounds unstable in the presence of heat and light.

These will break down in the motor with accompanying gum formation and corrosion, if the refiner doesn't eliminate the possibility by a heat treatment, usually in the form of redistillation. This question is of increasing importance today because of the development of some cracking processes to the point of making gasoline boiling points direct from the unit. Much of the advantage of making gasoline direct from the



Measure it by any standard you will—the Hope Vertical is a gas engine that will satisfy you, absolutely. It is in no sense a "cheap" engine—but it will give you "cheap" power. In the long run, year after year, under all loads, Hope Quality counts in all the ways which make for ample power, dependable, silent, unfailing service, and a day-after-day economy that always shows a healthy balance on the right side of your cost records.

Specifications? On what size unit?



ENGINEERS
CONTRACTORS

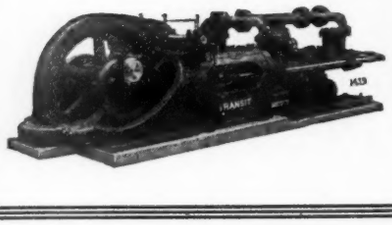
HOPE
Engineering & Supply
COMPANY
MT. VERNON, OHIO, U. S. A.

DESIGNERS
MANUFACTURERS

TRANSIT PUMPS

for large and small pipe lines

Descriptions on Request.



NATIONAL TRANSIT PUMP & MACHINE CO.

OIL CITY, PA.

District Offices: **New York, Pittsburgh, Tulsa, Cleveland, Houston and Denver, Philadelphia.**

"APPRAISAL OF OIL AND GAS PROPERTIES" by Dr. Roswell H. Johnson and Paul Ruedemann gives more detail as to working methods, with drawings and charts, than has ever been offered the oil industry in a work on appraisal.

The book contains 24 chapters as follows:

Kinds and Purposes of Appraisal; Definitions; Organization of Work; Calculation of Past and Present Yield; Line and Underground Loss; Estimation of Future Yield of Producing Wells—Methods and Decline Curves—Ultimate and Total Recovery—Undeveloped Areas, Proven and Unproven—Refinements; Prediction of Future Prices; Prediction of Future Operating Costs; Future Costs of Development and Improvements; Discount Factor in Annual Analytical Appraisals; Investment Risk; Computations for Appraisal of Wells; Valuation of Undeveloped Acreage—of Physical Property—of Intangibles; Computation of Depletion—of Depreciations; The General Report; Office Records; Appraisal for Fixing Rates; Appraisal of Casinghead Gasoline Production.

The correct valuation of oil and gas properties is so important as regards taxes, sale or purchase of properties, that every owner of oil and gas lands will find it profitable to have a copy of this most complete work on APPRAISAL OF OIL AND GAS PROPERTIES. Only a limited number of these books has been printed. *Send for your copy today.* Price $4.

Pin to your check

National Petroleum News, 804 Caxton Bldg., Cleveland, Ohio:

Send me APPRAISAL OF OIL AND GAS PROPERTIES. Enclosed is $4.

NAME _____

Address _____

City-State _____

cracking still is lost if the product must again be distilled.

It is the solving of this problem which constitutes the greatest claim of the inventor of the vapor phase method of treating cracked gasoline. This process is actually in use in this country on a commercial scale in three of the smaller refineries in the Mid-Continent. In one plant it has been applied directly to the vapor of a Cross cracking unit, in the others to re-run stills operating respectively on cracked distillates from Dubbs and Fleming units.

All of these plants claim satisfactory results and two are increasing their capacities. The action of the Fuller's Earth on the cracked vapors passed through it seems to be quite definite in its effect on color, color stability and gumming tendencies of the finished gasoline. The effect on sulphur content, while favorable, is to date not as far reaching as desirable, but some experiments are being conducted which I am told give considerable promise of success.

One of the advantages claimed is that cracked gasoline so treated has a greater anti-knock value because of the comparative non-elimination of the oilifines, etc., in contra-distinction to results with sulphuric acid treating and redistillation.

Best Hope of Success

It is my opinion after going carefully over the work done so far, both laboratory and commercial, that this process promises the best hope of a solution of the problem which has been offered to date. If the larger commercial installations contracted for and in prospect bear out the experience had so far, and both the treating and re-distillation problems are solved thereby, the vapor phase process will truly constitute a basic change in refining methods.

Others are at work on the problem, attacking it from the angle of a purely chemical solvent problem, but attempting to find some more selective and less destructive solvent than sulphuric acid. One line of investigation is with various copper compounds, another is directed to the chromimum derivatives.

Patents have been applied for in connection with both lines of research but today none of the methods suggested by either group of investigators seem to have given a satisfactory commercial result, and all of them include a number of extra steps which would have a serious affect on the cost of the operation.

The use of sulphur dioxide in liquid form, the Edeleanu process, has been applied commercially so far by at least two large refineries on the Pacific seaboard, to the treatment of kerosene fractions from the partly naphthenic crudes of the asphalt base type produced in California. Results are said to be especially good in eliminating difficulties encountered with those products by the use of either ordinary or fuming sulphuric acids, and in producing a long time burning oil.

The plants are expensive to install however, and require a high type of engineering skill to build, operate and maintain. So far the practical utility

of the Edeleanu process for the treatment of the more stable paraffine base products has not been demonstrated.

Nor has any commercial progress been made in applying the SO_2 method to the treatment of lubricating fractions in this country so far as are known to me.

One more element in connection with the refiner's treating and decolorizing problems which is assuming an importance sufficient to deserve mention as a basis improvement is the growth of the use of fine Fuller's Earth both in the refining of gasoline and lubricating oils.

This in a way, is a reversion to an old process. In 1896 George M. Saybolt, of Saybolt viscosimeter fame, applied for a patent on a process for neutralizing and further decolorizing hydrocarbon oils by the use of fine Fuller's Earth. This method was in extensive use for many years, principally on gasoline and kerosene, and for a short while also on lubricating oils, in time being displaced by the percolation filtration process.

The discovery of new types of Fuller's Earth west of the Rockies too fine to use as percolating material, renewed interest in this method. It seemed to offer a solution for a number of difficulties experienced in refining lubricating oils made from asphaltic and naphthenic base crudes, and has also found application in both overhead neutrals and residual cylinder stocks produced from paraffine and semi-paraffine base crudes. There are quite a number of commercial sized installations in various refineries throughout the United States.

No important changes in the separation and refining of crystalline wax have been made in recent years, but real progress has been accomplished in handling the so-called amorphous wax, more commonly referred to as petrolatum.

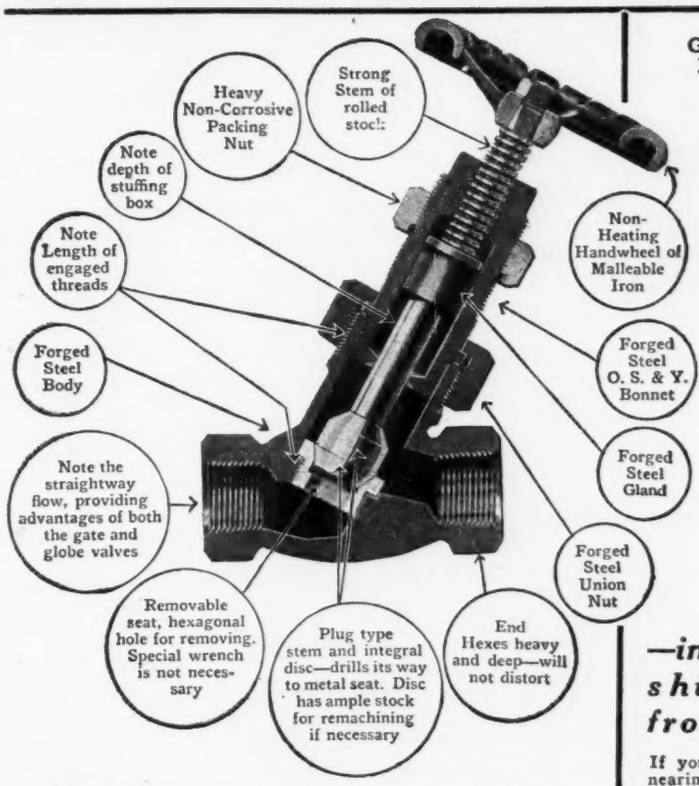
The fundamental basis of all methods of separating petrolatum from the containing petroleum liquids is that liquid wax contracts in volume when solidified by cooling, and its specific gravity is raised.

To visualize the progress that has been made in this branch of refining, let me recount a little history. Up to twenty-five years ago, the only known method of wax separation was to fill a large storage tank with Pennsylvania crude oil in the fall of the year and depend upon the gradual, steady cooling during the cold weather to bring about the solidification and settling of the higher melting point wax crystals into the lower half of the tank.

Though the dream of using centrifugal force was conceived many years earlier, it was not until 1917 that the experts of the Sharples Specialty Co., looking for new fields to conquer, tackled this problem for the refiner. They perfected the machinery which now forms an important part of the equipment of a great number of the more progressive lubricating oil refineries, operating on wax-bearing crude oils.

A number of worthwhile improvements in less important departments have contributed a considerable share to the general march of progress.

Edward Forged Steel Valves


Globe Valve
Plug Type
No. 682
Heavy Non-Corrosive Packing Nut
Strong Stem of rolled steel
Note depth of stuffing box
Note Length of engaged threads
Forged Steel Body
Note the straightway flow, providing advantages of both the gate and globe valves
Removable seat, hexagonal hole for removing. Special wrench is not necessary
Plug type stem and integral disc—drills its way to metal seat. Disc has ample stock for remachining if necessary
End Hexes heavy and deep—will not distort
Forged Steel Union Nut
Forged Steel Gland
Forged Steel O. S. & Y. Bonnet
Non-Heating Handwheel of Malleable Iron

Here are two outstanding reasons why you should standardize on Edward Forged Steel Valves.
(1)—designed and built for service up to 500 pounds pressure and intermittent temperature to 1100° F.—they therefore will fit any service need within this range.
(2)—because of quantity production these high grade valves are priced *low enough* to justify their use even in service far below their maximum rating.

The Edward Valve & Mfg. Co.
Main Office & Works East Chicago, Ind.

Representatives in all principal cities

—immediate shipment from stock

If you have a plant nearing completion—a few extra valves needed for last minute installation—an emergency arises where valves are needed quickly—wire Edward—specify "Forged Steel Valves"—immediate shipment will be made—any quantity—and any size from ¼" to 2" inclusive.
Edward Forged Steel Valves are made in both Globe and Angle pattern—Plug Type or Edward Protected Seat and Disc.

Ask for Refinery Catalog.

—for every refinery service

BETHLEHEM
WAX PLANT EQUIPMENT

Filter Presses — *Wax Moulding Presses*
Wax Distillate Chilling Machines — *Scale Wax Cooling Drums*
Wax Testing Presses — *Paraffine Wax Sweater Plants*
Complete Wax Plants designed and built
Pumps, Stills, Towers, Condensers and other Oil Refinery Equipment
Oil Burning Systems — *Complete Power Plant Equipment*

BETHLEHEM SHIPBUILDING CORPORATION, LTD.
BETHLEHEM, PA.
GENERAL SALES OFFICES: 25 BROADWAY, NEW YORK CITY

More Stress on Engineering Methods As Industry is Being Stabilized

By F. Julius Fohs
Chairman, Petroleum Division, A. I. M. E.
Presented at Annual Meeting, A. I. M. E., New York, Feb. 16.

The accompanying paper, here somewhat abridged, was read Feb. 15, to the Petroleum Division, American Institute of Mining and Metallurgical Engineers, at the annual meeting in New York. It is to be published in full by the Institute. It is commended as a comprehensive summary of the progress that has been made in producing oil, with some brief mention of other phases. The portion which dealt with progress in refining has been omitted, as it is discussed in other columns.—Editor.

AS an industry approaches stabilization, greater and greater stress must be laid on its technologic progress, which becomes a prime aid in improving its condition. The oil industry is tending toward this stage and hence its engineers must be pressed into greater service to prevent stabilization and stagnation from becoming synonymous, and to supply either by improvements in processes or by new machinery, a means of obtaining savings in raw and finished products. Thus profits can be assured warranting continued investment.

It may be repeated, technology must apply a slight improvement here, a change there, or a complete renovation, to eliminate inefficiencies and make each dollar invested yield greater results. The profits of yesterday were made of rich strikes, of monopolized patents or processes, of control of prices and of markets. Sixty-five years of growth, of large investments, of healthful competition, of expanding markets, have put the oil industry in the foremost rank of world industries.

A review of recent progress is attempted. This can only touch outstanding developments of recent years.

New Exploration Methods

Geology offers directly little new in the technique of oil-finding—major stress being laid on improvement in subsurface correlation by means of foraminiferal studies, additions to the knowledge of which are being made, slowly but surely, and by means of mineral, and especially heavy mineral, determinations in well samples. The most worthwhile—the general application of geophysics by means of torsion balances and seismographs, as a result of the experiments of the past two years, has proven the greatest new aid to geology.

As if to prove the theory that man's ingenuity rises to the requirements of his age—just at a time when the geologist had reached the point where mapable geologic structures were becoming scarce as dinosaur eggs, and far more valuable, (despite our present apparent flood of oil production), the physicist has offered the two types of instruments which will permit, under special conditions, the location of salt domes, faults and anticlines.

F. Julius Fohs

There are three types of torsion balances—Eotvos, Bamberger and Oertling—but all are essentially the same as the original Eotvos in principle, varying only in portability, sensitiveness and the presence or absence of a self-recording photographic attachment. These instruments give the differential in millionths of density of adjacent portions of the earth's surface. Thus beds of a higher density below one part of the surface, as in the case of limestone-anhydrite capped salt domes, may be distinguished from those of a lower density, ordinary unconsolidated sediments, surrounding them.

The seismograph attempts to make use of an entirely different principle, that of the differentiated velocities of pressure waves, refracted through different rock masses, such pressure waves being actuated by the explosion of a small charge of dynamite (one to two hundred pounds) at or slightly below the surface, and the recording of such waves, usually photographically, by means either of one of two general types of seismograph—mechanical or galvanometric. The mechanical type has frictional difficulties, while the galvanometric type tends to magnify, to some extent, extraneous sound or pressure waves. With proper checks the latter type offers the greatest possibilities, for it permits the separation and obliteration of most of the extraneous waves, due to greater magnification. Of this type, three machines are now, or shortly will be available for commercial use—the McCullom, Karcher and Rieber seismographs,—each possessing some special advantage,—while Eckhart is working on a fourth. These machines all require less dynamite than the mechanical, are equally portable, and have recording cameras. The mechanical machines include the German type used by Mintrop and modifications used by the Humble staff and Dr. Ricker.

Boring holes and use of smaller dynamite charges eliminate high cost of filling craters. The inclusion of proper time and air sound wave devices, it is believed, will ultimately reduce the cost of and necessity for, the elaborate land survey parties now in use.

Present Limits of Usage

A word of warning:—While a combined use of these geophysical methods will determine the approximate outline and depth of certain structures, a sufficient experience is not yet available in event surveys are negative to condemn the territory in which no selective results are obtained. Results appear obtainable with the torsion balance impossible to check with the seismograph and until further studies are made and some of these localities drilled, the failure of such check by no means condemns. This must continue true until the effective maximum depths for each instrument and a large amount of research into variable factors, shall as the reflective and refractive indices of various rocks, shall be determined.

Seismographs are practically valueless in most hard rock areas, where a repetition occurs of thin hard beds. However, since the bulk of the world's oil supply comes from younger beds, which ften prove capable of study by this means, they must become important factors in oil exploration. The next step—and one being attempted by a number of competent investigators—must be the application of reflected sound waves by means of which it may be possible to determine depths of various strata, one below the other, especially such as are of appreciable thickness. The general

principle of the sonic depth finder is here involved.

Following geology and geophysics, coring devices are becoming more and more important, and the new technique has largely to do with the improvement of double core barrels to be used in conjunction with rotary and even cable tool drilling, in order to eliminate doubt as to formations penetrated. Diamond coring devices have long been efficient for hard rock and this and other means are, except in special instances, adapted to shallow coring. While the diamond coring machine is being somewhat used with depth—special core barrels, such as the new modified, or Phillips-Elliott barrel, in conjunction with a rotary, permits accurate coring results to depths of 7500 feet and more. That accurate information, as to the character of oil horizon, is available by this means is most important when the great cost of deep holes is considered.

The next important requirement here is the determination, by research, of quantitative study of oil and water content of such cores; the Bureau of Mines will shortly publish some results that may prove helpful in this respect.

The increasing use of diamond and other coring for shallow exploration will probably show a manifold growth in the next five years—first as a means of proving indefinite structure and second, as a check on geophysical exploration. Diamond coring will be more and more restricted to regions of rigid beds; light portable rotary rigs, with the double core barrel, to wholly or partially unconsolidated beds and soft shales.

Production Engineering

This subject is young—very young,—actually only some 30 years old, but has made especially great strides in the past few years and is already playing a heavy part in changing the economics of producing petroleum. It covers a broad range of subjects and reference can be made to only a few of the more important that are being used to reduce exploration hazards, to hasten drilling-in and increase the depth of wells, and to increase production and lower costs.

In the development of new pools more complete and precise records are being obtained—by coring and otherwise, so that complete records of water levels and other essential data are available, from the earliest stages of development, instead of being obtained by a post-mortem, so that unnecessary drilling into water may be avoided and cementing back may be accomplished with precision, thereby saving many wells heretofore water flooded.

The two outstanding developments in well-spacing of medium to deep wells in flush pools, where the oil contains much gas, have been:

(1) A reversal of opinion regarding closely-spaced wells, as it has been demonstrated that, while first cost is greater, due to increased number of wells, their output is sufficiently increased to materially reduce the cost of lifting, and

(2) the necessity of arranging wells staggered in alternate rows in proper relation to direction of flow in order to avoid triangular blocks from which oil would fail to reach the wells.

While, in a few instances, offsetting agreements can be obtained between competing companies, in the majority of cases cooperation remains difficult of attainment.

In cable tool drilling, in addition to improvements in the shape of bits and heavier outfits and substitution of steel for wood drums, wheels, etc., a new type of cable tool has been developed by the Empire Companies research department, which permits local circulations of fluid whereby more rapid drilling may be done through muddy formations.

But real progress in the oil industry has come through the improvement of the rotary drilling rig and the perfection of rotary tools to answer almost every purpose. Ultimately this process will replace most of the cable tool drilling. Chiefly to this method must be attributed the rapid completion of wells and rise to peak production of recent major pools of this country.

Improvements in rotary drilling have come, for the most part through the production of heavier chain drive rotaries, with three-speed draw works, and the development of disc and roller rock bits. By means of the rock bit, hard rock can now be readily penetrated and they are also more effective in deep drilling. Among new rotary devices for attaining greater depths the Hild differential drive, now perfected for use where electric power is available and being adapted also for steam power, permits control of drilling heretofore unattainable. An aid having a similar purport is a steam pressure strip recorder. A new type of rotary, making use of the drilling mud as a source of power, is the Russian turbinal rotary.

Increase of Steel Derricks

Improvement in steel derricks has been such that wood is gradually being replaced. Special studies have determined the best stocks for many types of oil equipment. Drilling bits have been improved by use of specially tempered steels or wedding on of special drilling edges such as stellite.

Heavier casing and the use of a float valve for control in setting long strings are aids in deep drilling, as are a number of new fishing tools.

In finishing wells, high-pressure control heads and oil savers have proven invaluable in avoiding material losses of crude.

An electric "water-witch," recently perfected by the Shell Co., ascertains definitely the points at which water enters a well. The device is based on the careful measurement of the conductivity of the well.

New survey methods determine the extent of, and the direction in which, a well is out of plumb.

Cementing of casing and for the repair of wells to shut off water has received much attention. The Haliburton and Perkins processes are largely in use. Improvements are largely due to the use of portable cement wagons, arranged for the control of pressures up to 1400 pounds, and the use of heavy compounds to weight the cement plug. Acceleration of setting is attained by several compounds. One of these—lumnite—being effective in 24 hours. Such compounds may prove worthless in case of heavy gas pressures.

The exact measurement of muds and weighting of same by heavy compounds admit of perfect control in drilling through high pressure gas.

Improved Lifting Methods

In lifting of oil, advances have been made through studies of the effect of vacuum, air, contained gas, extraneous gas, water-flooding and deep-well pumping; and, while much has been accomplished, much remains to be learned. The chief advances have come through the application of the principles of the air lift to gas whereby the intermittent gas lift was developed by Lewis & Dunn for Mid-Continent conditions and the continuous gas lift by McLaughlin & Jones, and a modified form by Templeton, for handling the large volumes of water-free oil of California flush pools. Counterbalanced, long-stroke, pumping has been developed to handle large volumes of liquid. Recent studies by Uren of deep-well pumping problems, have been made available through this institute the past year.

The harmful effects on the ultimate production of a well by continuous swabbing, as a means of lifting oil, are well established.

Among new processes for cleaning out wells is the compressed air method developed by Dunn, which has the advantage over the cable-tool method of saving time and reducing costs. The use of warm oil, to rejuvenate paraffined wells, has been successful in both California and Eastern fields, in many cases practically doubling production.

Sanding of wells has been studied by John R. Suman and he has recently, in Mining and Metallurgy, suggested some remedies, though much remains to be learned. This problem affects the Gulf Coast and Venezuela wells and warrants much research.

Dehydration of oil-field emulsions has long advanced by three methods, (1) Tret-o-lite, with steam coils, (2) centrifuges, and (3) electrical separation. Dow, of the Bureau of Mines, recently presented a worthwhile summary of methods.

Electrification Increasing

The increase of use of electric power in oil fields is notable, and important installations have been made in California, Wyoming, Kansas and Oklahoma. The only large direct installation made purposely for an oil field is that of the Midwest Refining Co. at Salt Creek.

For the most part, electric power companies are not yet aligned to supply power cheap enough to permit the change. Besides, it requires the installation of special motor driven hoists, pumps, engines, etc. Its great advantage lies in economy of power, as exemplified by the use of portable engines, where heavier power requirements than normal are

Both high melting point and low freezing point are necessary in gear compounds and pressure greases. When you consider that they may be used in either extreme cold or extreme heat, these factors become vital.

ADVANCE Gearene and High Pressure Lubricating Grease are both manufactured by our exclusive high temperature method to drive off water and insure a complete mixture of oils and base. This treatment assures high melting point, while low cold test soaps and lubricating oils insure lubricating effectiveness in below-zero weather. The particular process itself is in a large measure exclusive—and so ADVANCE Gearene is an exclusive lubricant.

If you've never tried ADVANCE Gearene or High Pressure Lubricating Grease, send us your name and address and we'll send you FREE samples.

America's Greatest Grease Makers

AMERICAN OIL CORPORATION · · Jackson, Mich.

ADVANCE Gearene

and High Pressure Lubricating Grease

Every Filling Station

Self Closing Hydrant

Should Have a Genuine Murdock Hydrant

Because it will not freeze. It delivers water regardless of climate. At all times a convenience to the customer, preventing running in and out of stations and to yourself because it is not necessary to shut it off at night. Some of the largest distributors are using them.

ALSO DRINKING FOUNTAINS

Write for Catalogues

THE MURDOCK MFG. & SUPPLY CO.

CINCINNATI, OHIO

Makers of Outdoor Water Devices Since 1853

intermittently necessary. The improvement of spark-proof housings for motors, by both Westinghouse and General Electric, has been an important and necessary advance to permit their use of oil and gas wells where the fire hazard is great. The Hild electric drive permitting accurate control of heavy loads, in connection with deep drilling, will bring this type of power more into use for such wells. Besides, as water powers become further developed and oil fields more nearly exhausted, greater use of electric power in oil fields must be expected.

Effect of Improved Methods

Improved methods are responsible for considerable increase in recent production and probably account for more than 25 per cent of the production obtained from pools reaching their peak in the past three years and perhaps for one-fifth of the total production for 1925.

Major factors in increasing production are—

(1) Closely spaced wells, including inside locations, completed within a few months of the opening of the pool, thereby taking advantage of gas contained in the oil to obtain a maximum flow of oil from the wells.

(2) Use of air and gas lifts.

(3) Long stroke pumping.

(4) Systematic shooting.

In general, the effect of these methods is to cause a higher immediate and cheaper production from new wells and earlier exhaustion of bonanza oil, with possibly greater ultimate production, but uncertain conditions as to the recovery of oil remaining when the bonanza oil has been exhausted.

As to ultimate results: It is most important to distinguish between pools in which water-saturation under great pressure surrounds and the oil and those where this is not the case. Most of the large flush pools belong in this category. Hastened recovery under these conditions means earlier exhaustion of flowing and pumping oil and often in water-loging of portions of the sand.

It may be well to point out here that the figures usually given of low recovery of original oil in the sands do not apply to pools of this type; for, instead of from 15 to 30 per cent recovery, under ordinary conditions, these high-pressure pools yield 50 to 60 per cent, or even more, by methods now in use.

In any review of new processes, it must be emphasized that each is restricted to special conditions and, with additional use and research, these limits become more clearly defined. Thus, the gas lift system of the California flush fields is inadaptable to Mid-Continent pools with their waters and thinner sands, while the intermittent gas lift, in use in the latter fields, is inapplicable to such California production. Long stroke pumping, suitable to large mixed fluid heads, is useless where wells pump-off. Water-flooding, while applicable under Bradford sand conditions, where the sand has been practically water free and fresh water is available for flooding can be used in very few districts. Sand-

mining methods are likewise of restricted application.

Transportation

Transportation in the oil industry embraces the use of pipe lines, tank cars and tank steamers and, collaterally, pumping equipment and storage. Of more than nine billion dollars invested in the oil industry, eight hundred and fifty million are invested in transportation and additionally about 175 millions in steel storage only partly owned by pipe line companies. Recent advances in the technology of transportation have not been on a par with those in either production engineering or refining and yet, in many respects, a high efficiency has been reached.

Pipe lines are still largely constructed of soft steel pipe—usually eight inches in diameter—and the chief advance has been in the mechanical methods used in construction; thus ditching machines and pipe-laying machines have materially reduced the force of labor required. Joints, for the most part, are still threaded, though heavier couplings are used. A few companies lay welded joints. The latter are primarily used for gasoline transportation and one of the largest lines for this purpose—forty-eight miles—was laid by the Midwest Refining Co. a few years ago.

Where oil is of high viscosity and requires steam heating to transport, the old type of reciprocating pump still gives high efficiency. Vertical pumps of this type are used where above 300 H.P. The centrifugal pump is coming into favor for lighter oils.

Tank-car improvements have come chiefly in the form of heavier and explosion-proof cars for carrying gasoline and high-proof gasoline.

Tankers for ocean shipments have changed primarily in re-arrangement of upper deck and distribution of compartments for storing oil and refined products, and also in conversion—to a considerable extent—to oil-engine drive.

In steel storage tanks, efforts have been concentrated upon making them gas-tight, in order to reduce the evaporation of, and loss in, volatile products, and, in the case of stock tanks, improved bolted tanks which can be readily moved without cutting down the size, as with riveted tanks.

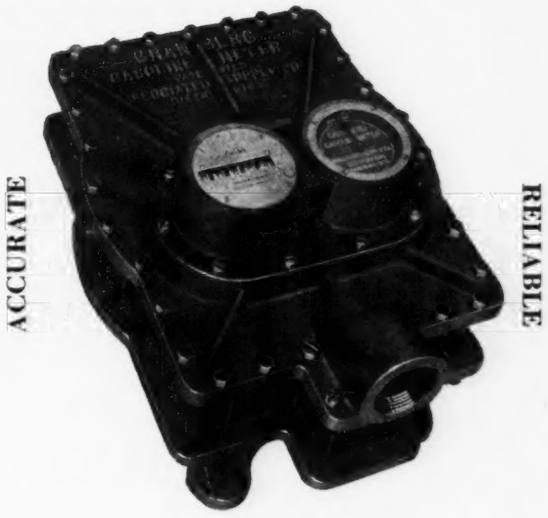
Standardization

Technologic progress is of two kinds—one purely mechanical, the other, one of method. To the former belongs the progress toward standardization of tools and equipment used in production, which is one of the most important results attained by the American Petroleum Institute and to J. Edgar Pew and Captain Lucey, who furthered such standardization, and the more than four hundred co-workers much credit is due.

Results to date include specifications for steel and iron pipe for oil country tubular goods, on rig irons and cable drilling tool joints and on four standard sizes of locomotive type boilers, covering two classes of working pressure. Practical agreement has been reached on standard rigs and derricks, and specifi-

ASSOCIATED OIL WELL SUPPLIES

The Granberg Petroleum Meter



SIMPLE

The GRANBERG METER is designed particularly for use on Tank Wagons and Loading Racks, and for general service in distributing plants. This meter will handle all Refined Petroleum Products, and will register accurately over its entire range of flow, within the tolerances promulgated by the Bureau of Standards.

The construction is very simple, making it possible to operate the meter under very low heads.

The GRANBERG METER will insure accurate records of receipts and deliveries. There are over 1500 now in use on the Pacific Coast.

Catalog and further information upon request.

ASSOCIATED SUPPLY COMPANY

Meter Department

79 New Montgomery St., San Francisco, Calif.
724 Pacific Electric Bldg., Los Angeles, Calif.

Cardboard Gaskets

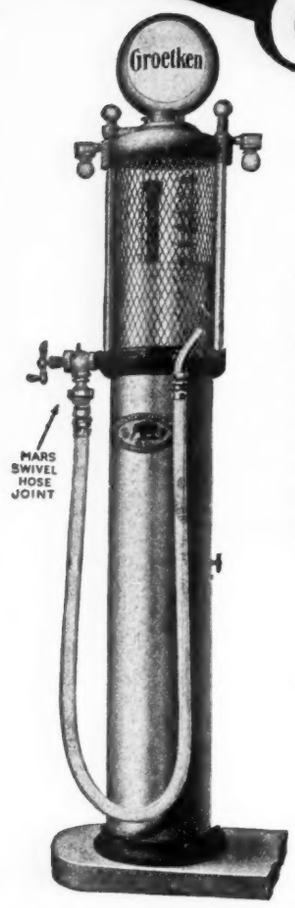
For { *Tank Car Domes* / *Tank Car Outlets* / *Low Pressure Stills* }

Any size in fractions of inches from 5 in. to 34 in.

FORNEY FIBRE CO.

100 Boyd Ave. ***Jersey City, N. J.***

GROETKEN SPECIAL



Fills 10 gal. in Less Than 30 Seconds

Every advantage, every convenience, every idea and every device for economical operation is embodied in these GROETKEN Super-Jumbo 10 and 5 gal. Visible pumps. And at prices that set a new standard in the oil industry. This is made possible only by specialization, mass production and our direct-from-factory sales plan. So much pump value for so low a cost has never been offered before. Our No. 57 five-gal. sells for only $74.00—same design and construction except capacity.

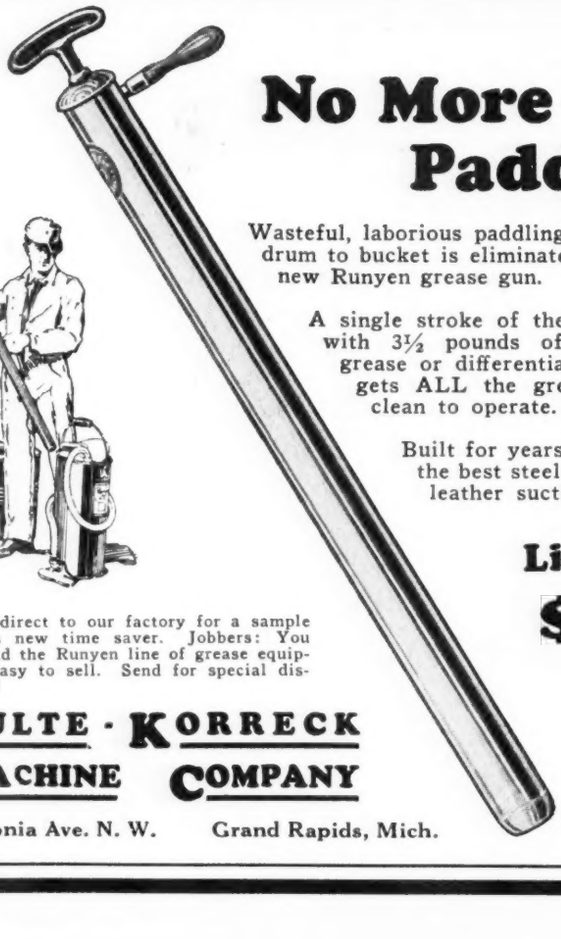
Remember, GROETKEN products are sold under full guarantee—direct to you at wholesale factory prices. That's the answer to such a remarkably low price.

Write for descriptive folder—today.

THE GROETKEN PUMP COMPANY
AURORA, ILL.

No. 76—10 gal. (wired for light, less globe and hose)

$102.00



No More Paddling!

Wasteful, laborious paddling of grease from drum to bucket is eliminated by this handy new Runyen grease gun.

A single stroke of the plunger fills it with 3½ pounds of either chassis grease or differential compound. It gets ALL the grease. Easy and clean to operate.

Built for years of service from the best steel tubing with soft leather suction cups.

List Price
$3.50

Write direct to our factory for a sample of this new time saver. Jobbers: You will find the Runyen line of grease equipment easy to sell. Send for special discounts!

PULTE · KORRECK MACHINE COMPANY

231 Ionia Ave. N. W. Grand Rapids, Mich.

cations will be completed in June. Tentative specifications have been adopted for wire rope and manila cordage, and final specifications are hoped for within a year. Rotary drill pipe standards were adopted and two standards for rotary drilling equipment have been completed, as well as miscellaneous standards covering hoisting blocks, drilling hooks and standard taper for drive bushing. Progress has been made on pumping equipment including sucker rods and engines as applied to the production of oil.

Tentative specifications, covering five kinds of belting, have been approved and it is hoped soon to have tentative plans and specifications for steel storage and production tanks. In addition, a new committee has been appointed to cover the matter of gauging and gauging practice. These results are available through the American Petroleum Institute bulletins and the specifications are being adapted at great initial expense by manufacturers, for it means ultimately a saving of millions of dollars to the industry.

The engineer, as a thinker and planner, is becoming a well-established factor in the industry. What can he do to best further its work?

(1) Cooperate with the practical man, who also has a definite contribution to make, and thereby facilitate the effectiveness of both.
(2) Sprinkle technical knowledge with the salt of common sense so as to make both more effective.
(3) Restrict his zeal so as to neither over-engineer nor over-machine the industry, avoiding expensive changes and installations unless fully warranted.
(4) Participate in special and group research.
(5) Contribute of his results by participating with papers and discussions—thus clarifying his own ideas and avoiding duplication of efforts by others, regardless of source.
(6) Refuse to approve statements and reports unless warranted by sound reasoning and facts, thereby maintaining a standard of light and truth for the ultimate advancement of the industry.

Conclusion

A survey of the field of petroleum technology must impress all with the large amount of real advance made in the past 15 years, for in that period have come the problems of organized search for new oil pools, of deeper drilling, of curtailing physical wastes, of handling large volumes of crude and refined products, of improving production and refining methods and of the many other problems hereinbefore stressed.

There must be no contentment with results attained but an earnest endeavor for the solution of such problems as search for difficultly discoverable pools, for better methods of recovery from sands, for more efficient refining methods, for more perfectly refined products, and finally, for more effective use of this bonanza resource.

Great Progress Has Been Made In Cracking; Much Yet To Learn

By Charles L. Parmelee
Consulting Engineer, New York

Delivered Before Petroleum Division, A. I. M. E., New York, Feb. 15-17.

IT is the purpose of this paper to outline briefly the state of our knowledge of the cracking art and to suggest some of the questions which are attracting attention of researchers at the present time.

The major purposes for which petroleum hydrocarbons including natural gas, are or have been cracked are:—

1. To obtain products used to increase the heat value and illuminant content of artificial gas.
2. During the World War, to increase the supply of toluol.
3. To increase the amount of products capable of conversion into industrial chemicals.
4. To produce pure carbon.
5. To reduce the viscosity of the oil, making it more available as fuel.
6. To modify the form of the wax content.
7. To increase the yield of motor spirit.

Gas Making

The use of petroleum alone and in connection with water gas for making artificial gas is of long standing. The controlling principles have been fairly well understood and the practice standardized for many years. This operation involves cracking the petroleum into hydrogen and other fixed gases, light volatiles which form illuminant and heat producing enrichers, tars and free carbon. If the cracking is incomplete, hydrocarbons in the motor fuel range may be produced.

Developments of the past few years suggest possibilities of changes in viewpoint and objects sought, which may result in material changes in this art in the near future. Among these may be noted:—

A. The preparation of special chemicals. During the war, toluol was obtained by stripping the gases in gas works, and special plants were installed and operated for the purpose of obtaining the maximum amount of this product. This practice has been discontinued, but the greater value of certain hydrocarbon molecules as bases for alcohols, acetates and other chemicals as compared with the value of such components as heat and light producers, suggests that stripping the gases at gas works may assume new importance. It is quite possible that for smaller plants the gas ultimately delivered may be a by-product instead of a major one.

B. Recognition of the value of cracked petroleum as an anti-knock motor fuel has already attracted the attention of the gas making industry, and consideration is now being given to the advantage of a combination of gas making and motor fuel preparation.

Where the gas industry is combined with the distillation of coal, the availability of benzol and similar compounds adds to the attractiveness of this line of effort. The combined making of water and oil gas, a process suggested some time ago, but not generally practiced, offers a possible large reduction in plant investment and makes it practicable to use heavy oils and residuums giving an increased amount of products available by stripping for petroleum chemicals and motor fuels, while at the same time maintaining the desired heat and candle power.

Chemical Manufacture

Two commercial plants have been installed at oil refineries to make alcohol out of materials obtained from pressure still gas. One commercial plant where the oil is cracked essentially for the making of the bases of alcohols, acetates, etc., is now going into operation.

The value of portions of the gases from petroleum cracking operations as bases for derived chemicals, suggests the possibility that such operations may be quite largely conducted for the major purpose of making unsaturated bodies convertible into organic chemicals.

Ethylene derived from the gases of cracked petroleum is of considerable interest to the industrial chemist as the basis for the manufacture of derived chemicals. Investigations of ways and means of absorbing this gas are now being conducted on a large scale.

Apparently, most of the dyes, organic chemicals, etc. now produced from coal tar derivatives can be made from petroleum hydrocarbons. It seems quite probable that the oil industry will give this field considerable attention.

Carbon Black

Cracking natural gas is a chemical action resulting from incomplete oxidation and has for its major purpose the production of pure carbon or lamp black. It is practiced on a large scale. The same product can be obtained by cracking liquid hydrocarbons but as usually performed, such cracking results in the carbon atoms set free assuming less desirable forms. Legislation limiting the use of natural gas for making carbon black is reported to have created a shortage of this material. New methods of making it from petroleum are being discussed.

Cracking for Viscosity

Heavy highly viscous oils are rendered more fluid by heat cracking. At the same time some gas and naphtha are made but so far the amount has been small. That such heavy oils will yield anti-knock fuels and bases for chemicals is recognized. This suggests the probability that the cracking of heavy oils under controlled condition may be practiced for a supply of motor fuels and chemical bases, and the desired viscosity of the resultant fuel oil will be secured as an incidental rather than a major purpose. This development may readily have considerable bearing on the oils available for fuel.

The difficulty of using for fuel purposes an oil heavily loaded with free carbon as usually results from cracking operations may be met by better control of the factors affecting the formation of free carbon or by the use of improved systems of burning the residuum. The heat value of carbon from cracking is high, if its consumption as fuel can be secured. As ordinarily encountered or handled in the residuum, it acts like graphitic carbon and is an inert burden on the operation.

Cracking Wax Content

Cracking the wax content of oil containing amorphous wax is common practice in the refining industry. It results in increasing the gas, naphtha and coke yield and converting the wax into forms which can be more readily removed by cooling and filtering. Modifications in refinery practice whereby the wax is removed in its original state without cracking, are in operation.

Cracking for Motor Spirit

By far the greatest present importance of petroleum cracking is in the production of motor fuel. In 1925, about 30 per cent of the motor fuel production of the United States was obtained by cracking. By the end of 1926, the available cracking units should be able to supply about 300,000 barrels per day of motor fuel from cracking, or about 45 per cent of the total 1925 production.

Hydrocarbons available for this purpose are produced in operations directed mainly along other lines. Likewise, in any operation for the production of motor fuel there will be a certain amount of conversion into forms not available for this purpose. One of the

major results sought in all systems of cracking petroleum for motor fuel, has been to hold the production of non-available by-products to the minimum possible. This condition may be changed in the near future by the development of the chemical possibilities of petroleum hydrocarbons.

At the present time, there are 26 cracking systems in commercial operation, each regularly running 100 or more barrels of charging stock per day. There are also 26 commercial size experimental or demonstration systems in occasional operation. It is difficult to devise a constructional or operative grouping into which these systems can be placed for general comparison. Such groupings are unsatisfactory, owing to the fact that most systems are mainly overlapping variations in the combination of fundamental features.

Use of Catalysts

While there have been many attempts to take advantage of the influence of catalysts in cracking petroleum, they have not been generally successful because of the costs involved. There are three commercial plants in operation in the United States using catalysts. One of these using anhydrous aluminum chloride is employed on a large scale for the production of saturated distillates and residuum. Two other plants crack the molecules while in the vapor phase with the object of obtaining the maxium amount of compounds available for anti-knock fuel.

With the increased interest in high compression fuels, the use of catalysts may become of increased importance. The principal determining factor appears to be the cost of operation. Perhaps the major advantages of the use of a catalyst is the ability to secure the cracking result at temperatures at or below the boiling point of the charging stock.

Use of Pressure

In 1925, about 98.5 per cent of the cracked gasoline produced was the result of operations under pressure of over 20 pounds per square inch. Of this, 73.5 per cent may be classified as low pressure, 20 pounds to 200 pounds per square inch; 15.9 per cent may be classified as medium pressure, 200 pounds to 400 pounds per square inch; and 9.2 per cent may be called high pressure, over 400 pounds per square inch. About 1.1 per cent of the cracked gasoline was produced at pressures over 1500 pounds per square inch.

Pressure is employed for two purposes:

1. To raise the boiling point of the hydrocarbons so that they may be heated to their cracking temperature while still in the liquid phase.
2. To affect the character of the products of cracking.

Among the reasons for the various pressures employed, may be included the following:

1. **Variations in charging stock.** The lighter the stock (lower its boiling point) the higher the temperature required to produce rupture of the molecules in the same time. Therefore, the boiling point must be raised higher to permit heating in the liquid phase. To accomplish this, the pressure must be increased. There is considerable difference of opinion as to the most desirable character of charging stock. Some advocate closely cut stock of narrow boiling point range, generally a heavy kerosene or light gas oil. The other extreme is represented by those who advocate charging heavy crude directly to the cracking stills taking off the natural and cracked products as an original blend.

Local conditions as to available equipment, character of crude or stock available at low prices, market for residuum, etc., have great influence in determining the procedure to be adopted. The increased yield of anti-knock molecules from the cracking of heavy petroleums is attracting attention. If the carbon deposition can be controlled or handled economically, this factor may affect the selection of the charging stock.

2. **Character of products sought.** With certain limitations, the character of the products of cracking is affected by the pressure on the molecule at the time of rupture. The lower the pressure, the more complete the fracture and the greater the amount of permanent gas and free carbon formation. It is known that hydrogen will combine with carbon at very high temperatures and pressures. These are considerably above those used in any commercial plant in this country. One German plant works with such conditions. It seems probable that the combining activity of hydrogen it not a suddenly acquired facility when a certain combination of temperature and pressure is reached, but that there is an increasing tendency to that end as the pressures and temperatures are raised.

It is claimed that considerable recombination of hydrogen does take place at fairly low pressures. The character of the major products and amount of gas and carbon formed is clearly affected by the pressures used. At very high pressure there is materially less free gas and carbon.

This recombining tendency is affected by the digestion conditions. Hydrogen in the nascent stage combines freely. Molecular hydrogen is inactive. This is the theory on which most developers are working in retaining all the products of cracking in intimate association for some period after their dissociation has taken place.

The modern tendency is clearly toward the use of materially higher pressures and temperatures. Up to 1918 there were no commercial plants in operation using over 200 pounds per square inch pressure and the temperatures were generally under 700° F. Pressures of about 1800 pounds per square inch and temperatures of about 1000° F. are now in commercial use. Possibly some of this increased use of higher pressures and temperatures is due to the improvement of the engineering technique in construction, making the operation less hazardous.

Marked advance has been made in the design of combustion chambers and type of mechanism used in burning the fuel. Mechanical stokers are quite commonly used for coal. More effective use is being made of radiant heat.

Return of flue gases for tempering the hot gases is a modern practice. Furnace temperatures must not be too high or there is danger of over-cracking. Careful control of air admission and preheating of the air for combustion are becoming standard. Automatic regulation of fuel feed to oil temperature has promising possibilities of gain in efficiency. Very slight temperature variations have marked effect on the continued efficiency of the cracking operation. Where the control is close and even, there is great gain in efficiency.

Present Problems

The cracking art today is very highly developed as compared with its state when Doctor Burton demonstrated its commercial practicability. There are many factors, however, which are known to exist, the cause and effect of which are not clearly determined. The next few years will probably see considerably better definition of the fundamental principles, and as a result, many changes are to be expected. Among the points to

Fohs Again Chairman of Oil Division

NEW YORK, Feb. 20.—The work of the petroleum division, A. I. M. E., goes forward this year under the direction of F. Julius Fohs, geologist and vice-president of the Humphreys Corp. Mr. Fohs was first elected to the chairmanship in 1924 and was reelected this week. There was one other nominee, the name of M. M. Valerius, Tulsa, being presented by Frank Herald, of Tulsa.

Last year one vice-chairman was chosen. This year, in view of the greatly enlarged scope of activities of the division, five vice-chairmen were chosen, as follows:

Charles H. Osmond, vice-chairman for refinery engineering. Member of Crandall & Osmond, consulting engineers, New York.

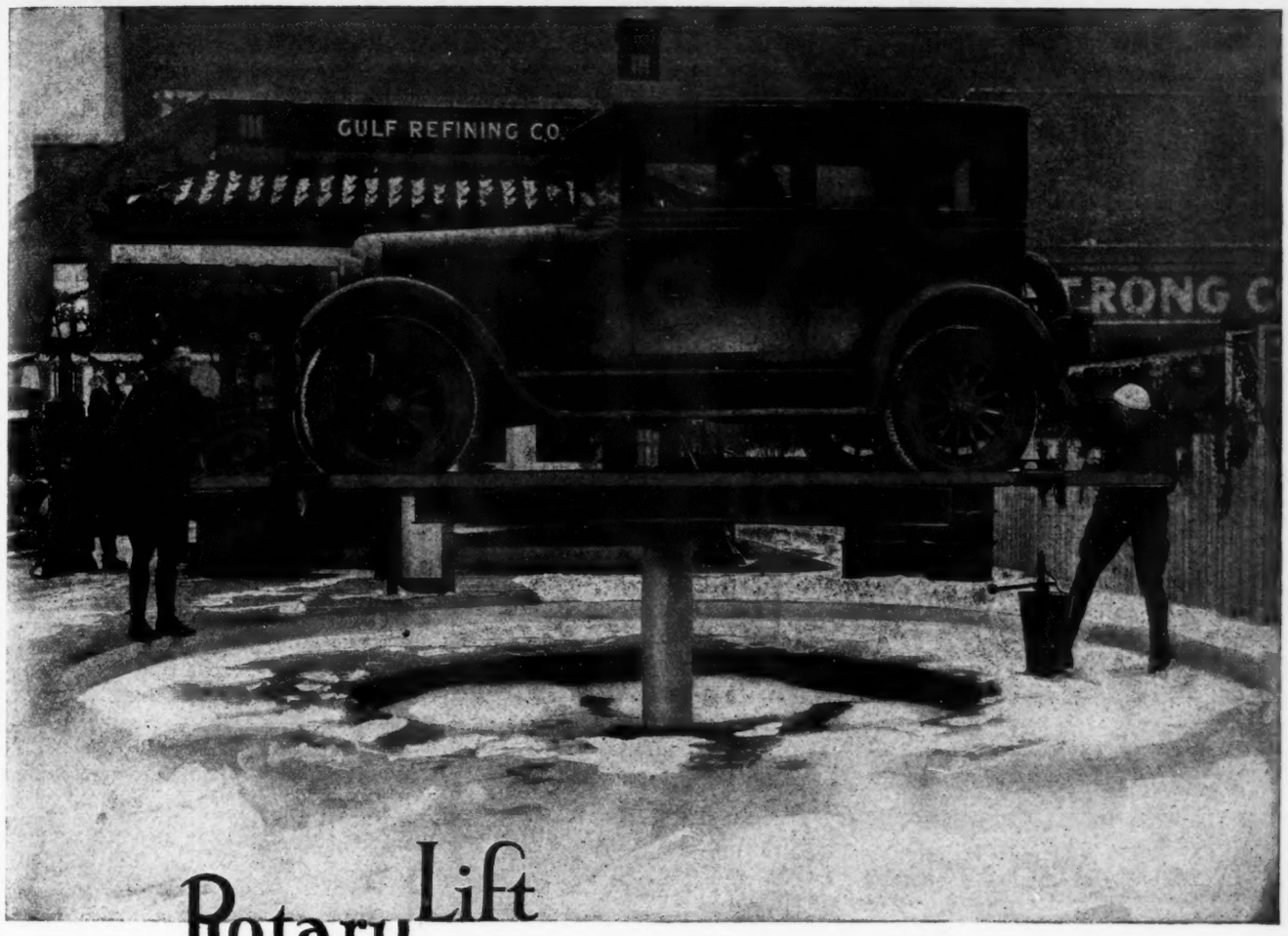
T. E. Swigart, vice-chairman for production engineering. Production engineer for the Shell Co., California, Los Angeles.

Douglas S. Bushnell, vice-chairman for transportation engineering. President, Buckeye, New York Transit, Northern and Indiana pipe lines.

James H. Gardner, vice-chairman for production. President, Gardner Petroleum Co., Tulsa.

Joseph E. Pogue, vice-chairman for economics. Consulting engineer, New York.

The secretary, Cresap P. Watson, assistant to the president of the Amerada Petroleum Corp., was reelected.



Rotary Lift

Visible lubrication all year round

THE above photograph was taken just after the recent blizzard swept the Eastern coast. Although the storm was one of the heaviest since the now famous blizzard of '88 and traffic was practically stopped everywhere, *servicing went on as usual at this filling station.*

The attendants were glad to render the usual efficient service for which this station is known. And why not? No lying in the snow and ice, no wet clothes, and no danger from slippery ramps. What better indication of the all-year-round use of the Automobile Rotary Lift?

Users everywhere are enthusiastic about this combination turn-table and hydraulic Lift. Now for the first time servicing of cars can be done quickly and efficiently in summer and winter alike. This means no loss of business and unexpected additional profits at most filling stations.

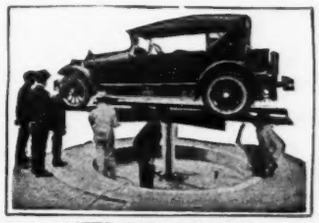
Car owners as well as the trade appreciate the safety and convenience of the Lift. No ramps to worry about. No maneuvering and jockeying around to drive on. Lift loads at ground level, is raised four feet in forty seconds, can be rotated any angle and lowered facing any direction. The price is within the reach of every filling station owner who is in business to stay.

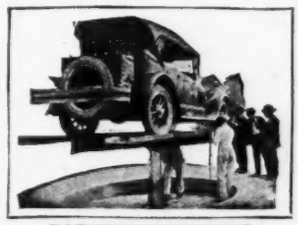
Equipment consists of two channel iron tracks, 16 feet long, mounted on center piston. Piston works in oil and lifts car by hydraulic action. Pressure supplied by any compressed air system. Special spring spraying equipment with each Lift. Blue-prints and details for installation furnished on request.
Don't wait until Spring. Act Now!

AUTOMOBILE ROTARY LIFT COMPANY
Memphis, Tenn.
Division Sales Offices: Chicago, New York and San Francisco

Rotary Lift TRADE MARK

LOADS AT GROUND LEVEL

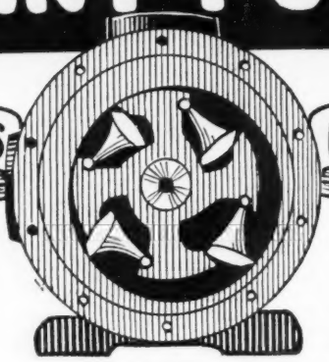

LIFTS CAR QUICKLY


ROTATES ANY ANGLE

GIVES AMPLE HEAD-ROOM

BLACKMER ROTARY PUMPS

MORE GALLONS PER DOLLAR



Dominates the field in transferring oil and gasoline.

Capacities from 3 G. P. M. to 500 G. P. M. hand or power operated.

District Offices

284 Peachtree St., Atlanta, Ga.
709 Title Bldg., Baltimore, Md.
428 Old South Bldg., Boston, Mass.
52 W. Chippewa St., Buffalo, N. Y.
608 So. Dearborn St., Chicago, Ill.
1347 Book Bldg., Detroit, Mich.
408 Austin St., Houston, Texas.
4025 Boulevard Place, Indianapolis, Ind.
1505 Commerce Bldg., Kansas City, Mo.
1320 Starks Bldg., Louisville, Ky.
429 Broadway, Milwaukee, Wis.
549 Plymouth Bldg., Minneapolis, Minn.
306 Wells Fargo Bldg., New Orleans, La.
71 Murray St., New York, N. Y.
904 Real Estate Trust Bldg., Philadelphia, Pa.
711 Ferguson Bldg., Pittsburgh, Pa.
1516 Pine St., St. Louis, Mo.
693 Mission St., San Francisco, Calif.

BLACKMER ROTARY PUMP CO.
GRAND RAPIDS (FORMERLY PETOSKEY) MICH.

Vogt Products For The Oil Refiners

We manufacture Paraffine Wax Presses, Distillate Chilling Machines, Stills, Auto Truck Tanks, Special Refinery Equipment, Boilers, Refrigerating Machinery, Drop Forged Steel Valves, and Fittings. Bulletins On Request.

Henry Vogt Machine Co.
Incorporated
Louisville - - - Kentucky

Branch Offices
New York Chicago
Philadelphia Dallas

which attention is now being directed are:

1. **Most efficient character of charging stock.** It is quite probable that local conditions are so widely at variance and so subject to changes as to prevent any generally uniform practice, but there is no question that more careful consideration of this point would be helpful in many cases now in operation. The demand for anti-knock fuels affects this question and may readily control decisions in connection with the stock and methods of treatment.

2. **Method of heating.** The use of powdered fuel offers an attractive means of using low grade coals and still carbon. In most cases, there is still considerable room for improvement in design of combustion chambers, control of furnace temperatures, utilization of radiant heat and exhaustion of available heat in flue gases. The advantage of electricity as a definitely controllable heating means is recognized, but its cost has been prohibitive.

Patent Situation

In this art as in any other, there has been extended effort on the part of researchers and developers to protect their ideas by patents. Over 2500 United States patents have been issued and about as many more applications are pending, which more or less purport to affect the cracking art. Not a single cracking patent has been adjudicated as yet, and while there is considerable litigation pending none of it promises to definitely clear the much confused situation.

Not one of the licensing concerns has a clear undisputed field and on the other hand, it is held by some that no one has any legal rights of a broadly controlling nature.

The Attorney General of the United States has questioned the scope and validity of all the major patents of the so-called Patent Club, which includes the Burton, Cross, Ellis, Holmes-Manley, Adams and other patents.

It is not probable, however, that in all of these patents the courts will fail to find any merit. On the contrary, it is to be expected that some of them will be held to have sufficient breadth to create controlling rights to certain forms of practice.

In the use of the petroleum cracking art as in any other, success demands a thorough knowledge of the existing local conditions and an intelligent application thereto of the best information available, always subject to the tempering of practicability. There is no mystery about its application, but there is great misunderstanding among its users. We know how to utilize some of the fundamental principles, but we are far from knowing the best method and the next few years will probably see great advances in efficiency and economy. Standard practice today may be obsolete tomorrow because of new developments in methods available and objects to be obtained. There is room for better engineering in this as in most other arts. It must be exercised, however, with due regard to the patent rights of others.

Feld Type Scrubber from Gas Industry Is Adapted As Gasoline Absorber

By J. C. Chatfield
N. P. N. Staff Writer

TULSA, Feb. 20

THE spur of keen competition in the manufacturing branch of the oil industry has resulted in greater progress in equipment and methods in the last two or three years than in any similar period in the history of the business. Manufacturers of natural gasoline as well as refiners have made great strides in efficiency.

During the last year an outstanding development in the natural gasoline industry has been the introduction of new types of absorbers to replace the static absorber. These new absorbers include the foaming or frothing type represented by the Newton process and more recently by the Campbell oil froth absorbers. The bubble tower which has come into general use at refineries has been adapted to the natural gasoline plant as an absorber notably by the Southwestern Engineering Corp.

Another recent absorber is the mechanically operated centrifugal absorber of the Feld type which is offered by the Bartlett Hayward Co. of Baltimore. This is not a new device. It has been in use for more than 10 years in the manufactured gas, metallurgical and chemical industries. It is designed for use in any industry where plant operations require the recovery of commercial products from gas or the removal of harmful constituents such as dust from gas.

New Installation in Texas

The most recent installation of Bartlett Hayward absorbers in a natural gasoline plant in the Mid-Continent has been made at the Eastland, Texas, plant of the Arab Gasoline Corp. Two units have recently been completed there. Roxana Petroleum Corp. has one unit at its gasoline plant at Stroud, Okla., and one for recovering gasoline from still gasses at its refinery at Wood River, Ill. The Texas Co. has a similar installation at its refinery at Port Arthur. Previous installations in other districts include three at plants of the Shell Co. of California, and one at the Carnegie Natural Gas Co. plant at Waynesburg, Pa.

The mechanically operated absorber is different from any other in use at natural gasoline plants. The static absorber presents a film of oil to the contact of gas. The foaming or frothing type as well as the bubble type surround portions of gas with bubbles of mineral seal oil. The Feld type of scrubber is designed to break up the mineral seal oil into a fine mist and force it through the gas to achieve an intimate mixture.

The apparatus consists of a series of from 9 to 11 superimposed scrubbing chambers as shown in Fig. 1, a vertical section of a typical absorber. Through the center of the chamber runs a revolving shaft to which are attached sets of truncated cones. The shaft is designed to run at about 200 revolutions per minute.

Below each set of revolving cones is a basin to catch mineral seal oil as it descends from the chamber above. These basins as well as the baffles to direct the flow of gas and mineral seal oil are attached to the walls of the absorber.

Oil in each basin is pumped upward by the rotating cones, from the upper

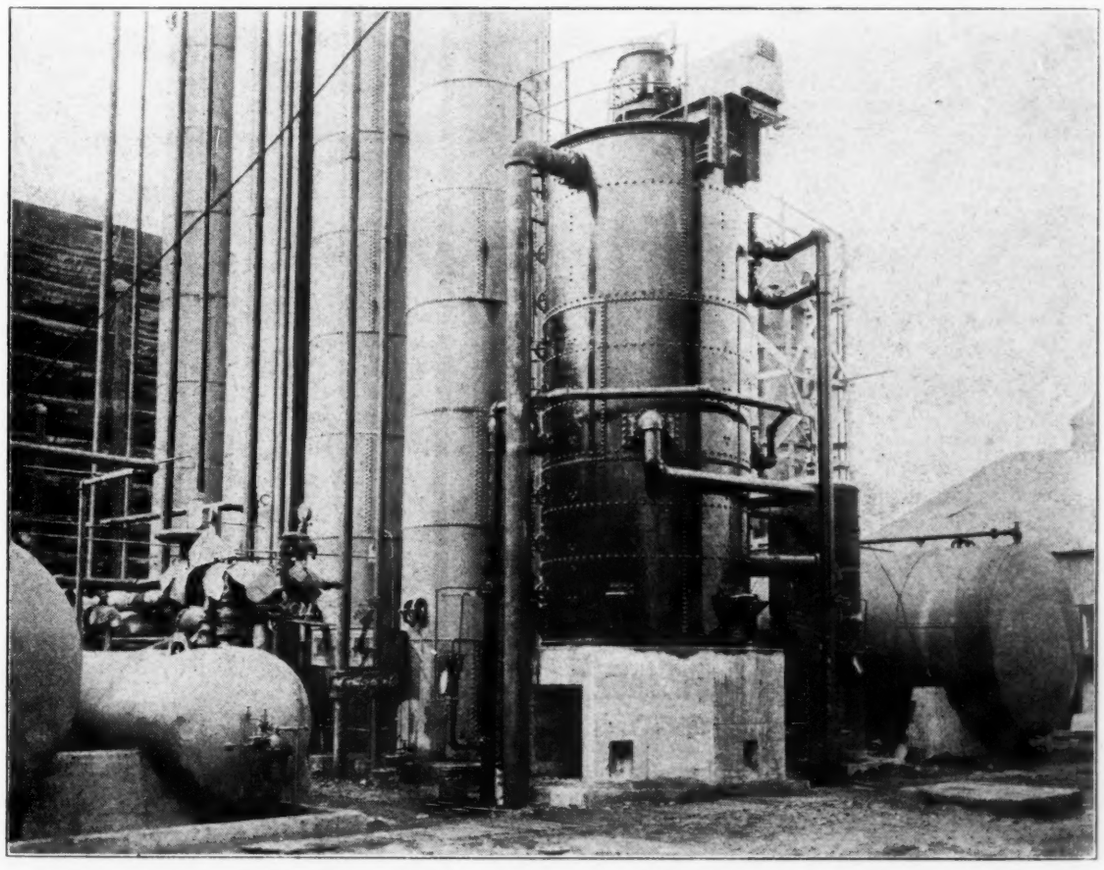


Fig. 2. Bartlett Hayward, Feld type absorber installed beside four static absorbers.

edges of which it is thrown outward toward the walls of the absorber. It will be observed in the drawing that the outer cone extends above the edges of the three inner ones. This outer cone is perforated with thousands of tiny slots which are calculated to break up the sheets of mineral seal oil into a fine spray through which the gas must pass in its upward journey through the absorber.

After passing through the gas the mineral seal oil falls on a baffle from which it falls back into the basin and is recirculated as described before. There is an overflow from each basin to the one beneath regulated by the rate at which lean oil is admitted at the top. Measured tests conducted by the manufacturers of the absorber have shown that each set of cone sprays oil through the gas at the rate of 250 to 300 gallons per minute, regardless of the rate of oil input. This is pointed out to show the tremendous number of contacts of the oil with gas during its travel through the absorber.

In the Feld type the spray of oil is thrown from the top of the inverted cones to the walls of the absorber.

Water Cooling Coils

In each basin except the top two are water circulating coils for the purpose of keeping the mineral seal oil at a proper temperature. The cold water absorbs the heat of absorption.

The stream of lean oil entering the absorber is divided and simultaneously enters the two upper chambers. Overflow from both of these chambers is into the third chamber. This feature of the absorber is one which is stressed as a talking point by the manufacturer.

The whole object of a counter-current absorber is to bring lean oil into intimate contact with the leanest gas which is about to leave the absorber. By dividing the oil stream the Feld type absorber passes the leanest gas through two zones of sprayed lean oil for the purpose of picking up the last bit of gasoline from the vapor. By sending the overflow direct to the third basin from both chambers there is no possibility of lean gas coming in contact with partly saturated mineral seal oil. In any static type of absorber the incoming oil immediately becomes partly saturated and its vapor tension is raised so that the tendency of the oil will be to reject the lightest gasoline fractions left in the gas.

Both of the upper basins are smaller than those below and baffles are eliminated to reduce velocity of the gas. Eliminator baffles above the top basin cause the gas to enter an annular passage before being withdrawn. These features were designed to eliminate the entrainment of oil in the residue gas.

Size of Units

Bartlett Hayward absorbers vary in size according to capacity desired. Diameters range from 5 to 8 feet and height from 20 to 24 feet. The Arab plant absorbers at Eastland are 8 feet in diameter handling 11,000,000 cubic feet of gas per day at 35 pounds pressure. The gas tests 1.3 gallons per thousand. One installation of the same size handles 18,000,000 cubic feet of 0.2 gallon gas at a pressure of 80 pounds.

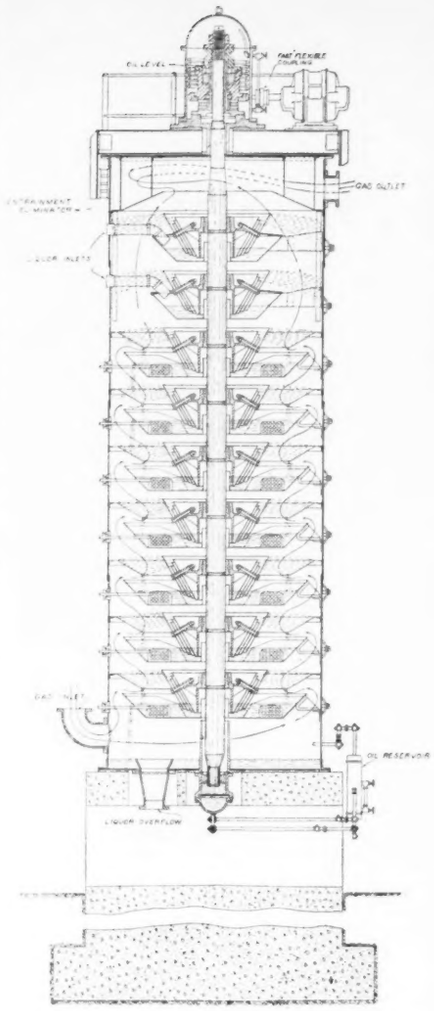


Fig. 1. Vertical section of Feld type absorber.

The rotating shaft may be driven by steam turbine, electric motor or by a belt to a gas engine. All three methods are in use. At the Roxana plant at Stroud an electric motor is used. The largest absorbers require 36 HP. and the smallest 20 HP.

No weight is borne by the bottom bearing which acts merely as a roller guide. It revolves in an oil bath under gas pressure. The weight of the shaft and cones is borne by roller bearings at the top and is driven by a worm gear and horizontal drive shaft, all housed together in an oil bath under gas pressure. There is but one packing gland between the housing and the power unit. The machinery moves so easily that it may be turned readily by grasping the coupling of the drive shaft with one hand.

Channeling of gas in this type of absorber is impossible. It is forced to pass through the successive spray zones. Stoppages due to sediment or carbon have not occurred due to the fact that the mechanical pumping of oil from each basin keeps the oil agitated and any sediment in suspension. The pressure decline through the absorber is low even at maximum capacities. At the Arab plant the decline is less than one pound.

Small Oil Circulation

One feature which is stressed by the manufacturers of all of the newer types of absorbers is the greater saturation obtainable and the consequently smaller amount of mineral seal oil needed to do a given piece of work. It has been asserted many times that in ordinary practice it is the most difficult to get the last few drops of gasoline out of the gas. The first 80 per cent of recoverable gasoline can be absorbed by half as much mineral seal oil as is needed for a complete absorption of all the commercial gasoline.

One indication of the efficiency of the centrifugal absorber is seen in the fact that at the Arab plant the charcoal test of tail gas showed 0.04 gallon per thousand after the absorber was put in as compared with 0.08 gallon with the former static absorber. These results were obtained with the same rate of oil circulation and same temperatures.

It is claimed by the manufacturers that it has been possible to decrease oil circulation from 40 to 60 per cent with no increase in the gasoline content of tail gas by the charcoal test. On one installation on 2-gallon gas at 30 pounds pressure where 40 gallons of oil per thousand cubic feet of gas had been circulated, the oil rate was cut to 20 gallons. Formerly the lean oil had a saturation of 0.9 per cent and the tail gas showed a gasoline content of 0.14 gallon while after the installation with the halved oil rate the lean oil was reduced in gasoline content to 0.6 per cent due to the reduced load on the stills, the tail gas showed a content of 0.11 gallon and the fat oil, figured from actual production, had a saturation of 10.5 per cent. At another plant with lean oil stripped down to 0.2 per cent saturation a tail gas content of 0.03 gallon was checked from 1.3-gallon gas at 30 pounds with a temperature of inlet oil at 85° F.

Higher First Cost Offset

The mechanically operated absorber is more expensive than a static tower on first cost but the manufacturers claim that this added cost is balanced off by the decrease in heat exchanger, oil cooler, still and pump capacities on new installations. In overloaded plants the mechanical absorber would be recommended to bring production up to an efficient standard.

Operating expense of the absorber is controlled largely by local conditions. The electric motor is the most expensive ordinarily. With purchased power at 1 cent per kilowatt hour the largest type of absorber would cost around $6.44 per day to operate.

In other articles to follow within the next few weeks the writer will describe a number of other new types of absorbers being offered to natural gasoline manufacturers.

Cincinnati Advertising Globes

"Those Globe Faces *have already arrived from* Cincinnati"

"They're not only here *ahead of expected time* but far *ahead of anything I've ever seen in good-looking globes* . . . . . and not a single one damaged in transit, either".

That's just the kind of reception with which Cincinnati Advertising Globes and Glass Faces meet everywhere. For, a promise of delivery is a part of our merchandise, fulfilled faithfully because our production methods and capacity permit us to conform accurately with market requirements.

The striking beauty is conspicuous at first glance—the clean-cut lettering or insignia greets the eye impressively—the business-like manner of packing is convincing of safety—all these points substantiate the fact that Cincinnati Advertising Globes and Globe Faces are not ordinary products. They're your advertisements, the mouth-piece of your business.

THE CINCINNATI ADVERTISING PRODUCTS COMPANY

1101-1107 York Street

Cincinnati, Ohio

Your next order should be placed only after asking "Cincinnati" to quote you.

4 Points!

1. Glass Colors Fired In. *As permanent as the glass itself—more brilliant than paint.*
2. Scientific Annealing Process. *Anti-Breakage insurance.*
3. Delivery When Wanted. *Any quantity.*
4. Low Initial Cost—Least Final Cost—Less Replacement.

GLASS SIGN SPECIALISTS for 27 YEARS

More Business *from* Air Service

Motorists even drive out of normal route to use ECO Automatic Tire Inflators

MODEL 20

Less Service Time
More Selling Time

ECO Comes in light models, sold at prices that will interest you. Rapidly being adopted as standard equipment by the larger oil companies. Write for detailed information.

The new ECO Automatic inflator serves air with absolute accuracy. It is graduated in pounds for balloon tires and delivers air at full compressed pressure without reduction. It will attract business — give your customers fast—clean—accurate service.

The driver who once uses it, wants ECO service all the time. That keeps him coming back to your stations.

One man with an ECO station can work faster than two men with an ordinary station and hand air-gauge. Just turn the pointer to the pressure desired, and apply the air-chuck to the valve stem. The ECO bell rings while tire is being filled, and stops as soon as right pressure is reached. When bell stops ringing, pressure is automatically shut off, and the job is done.

To get the utmost out of your air service, put ECO Automatic Tire Inflators on your present air towers. And specify complete "ECO" equipment for all new stations. The ECO bell is automatic advertising that pays.

Western Mfg. Company
Oskaloosa Iowa

ECO
Automatic Air Station
"The Station That Rings the Bell"

MODEL 50

F. H. Emig Leaves N. P. M. A. to Take Up Accounting

CHICAGO, Feb. 20.—F. H. Emig, for the past year manager of the collective buying department of National Petroleum Marketers' Association, resigned effective Feb. 15. Weston Atwood, who became identified with the executive staff of the association a month ago, has been assigned to take charge of the department for the present at least.

Mr. Emig is going in business for himself. He is an accountant of considerable reputation and has given most of his business life to oil company accounting. Now he proposes to sell his services to jobbing firms who want their books audited and their affairs straightened out generally, or who want new systems of accounting installed to better take care of an expanded business.

F. H. Emig is the author of a series of articles on accounting which were published in National Petroleum News in the winter of 1923-24 and were later issued in book form. The articles were published anonymously but the book developed a surprising demand and the publishers were obliged to put out a second and a third issue.

Mr. Emig has already left Chicago on his first special accounting assignment and his work probably will be only for one week or two at a place. He will keep in touch with National Petroleum News however and any oil man who wishes to correspond with him can reach him in care of National Petroleum News, 812 Huron Road, Cleveland, O., with only slight delay.

Butler Salesmen's School Has 13th Birthday

KANSAS CITY, MO., Feb. 20.—A program of songs, speeches, souvenirs and prizes helped to brighten the banquet which closed the 13th annual salesmen's school of the Butler Mfg. Co., which was held in January at the Kansas City Club. Salesmen, officers, plant foremen, and managers from the Minneapolis office as well as those from Kansas City, attended the banquet, attendance totaling 83.

Charles R. Butler, president, who with E. E. Norquist, vice president, organized the company in 1901, was toastmaster.

Music was furnished by the company's own orchestra. C. C. Crouch, vice president and manager of the Minneapolis office, who played a violin that he made himself, acted as music conductor.

Wives of the men and women employes enjoyed a theatre party during the evening of the banquet and later attended the raffling of prizes which included articles and money presented by business organizations and directors of the company.

Gasoline And Other Motor Fuels

by Ellis and Meigs, is a book which gives a complete survey of the field and a description of practically every process of making gasoline and most other motor fuels of promise or prominence.

The price of the book is $10. Just send us your check and we will mail a copy of it to you.

National Petroleum News, 807 Caxton Bldg., Cleveland, Ohio

Methods of Recovering More Oil From Depleted Fields

By James O. Lewis
Petroleum Engineer, Tulsa

Part 2

Delivered at Federal Oil Conservation Board Hearing, Washington, Feb. 10-11

THE pressure process is less exacting as to practical and economic conditions, and therefore is most generally applicable. It can be applied early in the life of a pool and merged into natural recovery with added profit to both. It can be applied with least disruption of present equipment, practices and customs.

It is more flexible in use, lends itself more readily to experimentation and finally leaves the property in condition to apply whatever improvements that may be made in the future on this process or to the later use of either mining or flooding, should experience show that additional and profitable recoveries can be obtained.

As between the use of air or gas as the pressure medium, experience in the eastern fields, where the process has been longest in use, fails to disclose any objections to air so serious as to warrant paying a high price for gas or for withholding gas from a high market.

Gas Desirable Where Cheap

Where gas can be obtained cheaply, it is desirable to use it, but in most old fields, gas is not cheap. The air, as it passes through the rock, picks up gas and gasoline vapors, and this mixture, under proper safeguards, can be returned to the rock, and in this way, the pressure medium can be kept more than half gas and gasoline vapors for many years.

As stated by Mr. Henry L. Doherty, gas is more soluble in oil than air, and it is also more effective in reducing the hold of the oil to the sand, but such advantage as may be gained in this manner may be lost in whole or in part by the greater solubility of the gas, making it a less effective expelling agent.

Laboratory experiments on a gas some four times as soluble as air showed that it would force out hardly one-fourth as much oil as air, volume for volume. The more soluble gas tends to pass through the oil in a state of solution rather than forcing the oil ahead. The effect may be compared to the action of a piston in a cylinder when holes had been drilled through the piston head.

Gas Should Be Studied Further

However, I do not regard the evidence as conclusive and a study of this question under varying conditions should be made. If further evidence is confirmatory, it will mean that several times as much energy must be expended in the compression of gas to obtain as much results as from the use of air. But there are some incidental advantages to the use of gas that also warrant consideration.

—Underwood & Underwood

James O. Lewis

Mining is an old method that was revived and modernized by the Germans during the late war. The use of the word "mining" is a misnomer, for the sand is not brought to the surface and the oil there extracted, but the oil drains by gravity into galleries driven through the sand body.

According to J. B. Umpleby, some 15 miles of galleries have been driven at the Pechelbronn Mines, which are now controlled by the French, and at Wietz, near Hanover, some five miles of galleries have been driven.

Opportunities For Study

These galleries have given incomparable opportunity to study the oil sands and to ascertain beyond question what the recoveries have been. Both localities are old oil fields previously brought to commercial exhaustion by the usual methods of natural production. As stated before, the increased recovery at Pechelbronn has been 300 per cent; that is, approximately one-seventh of the oil had been recovered by wells in the usual way, three-sevenths more had been recovered by drainage into the galleries, leaving three-sevenths in the rock.

The gallery method has been used in several places in this country in past years, notably in California. More recently it has been tried out on small scale operations, the most important of which have been the operations under Ranney, at Jacksboro, Texas. Doubtless, extensive tests will be made in the properties. A high initial outlay will be required and the cost of development is generally estimated as not less than $4000 an acre, which will, in part, be offset by comparatively low costs of lifting the oil to the surface.

Flooding has been conducted for the past 35 years in the Bradford field in Pennsylvania and New York. Water is let down certain wells and makes its way through the sand forcing oil ahead of it. Ordinarily the natural water head is used and no machinery is required, but the process is probably the most costly of the three as it has been found necessary to drill many new wells, best practice demanding two of each acre of land, whereas one well to each four to 10 acres was formerly the custom for natural production. When the water advances to a producing well it is converted into a water intake well and a new producing well is then drilled a short distance ahead.

Flooding Extensive At Bradford

Flooding is being conducted extensively only in the Bradford district, but small natural and induced floods are going on in numerous places and there are many records of such floods in the past. At Bradford, flooding has been commercially successful in the majority of cases in that profits have been made in spite of the high development costs.

Melcher states that careful estimates show an average original oil content of about 40,000 barrels, an acre, of which J. B. Umpleby claims that 3,000 barrels have been recovered by wells in the past and an additional 6,000 barrels by flooding. Larger estimates of recovery have been made but they involve theories of estimating that remain to be proved.

The most objectionable features to flooding at Bradford are the excessive development cost of drilling new wells which amounts to $3000 to $6000 an acre, and the fact that it leaves the sand flooded with water, which may possibly prohibit the recovery by improved processes of the remaining 60 per cent of the oil that is not recovered by the water. Should the soda-ash method be fully

successful, these objections may be overcome, but at the present outlook, air pressure promises to give just as much profit even though only half as much oil were recovered. It is as yet unknown what recoveries will be obtained by air at Bradford, but in any event, air can be followed up by water flooding or any other process.

Outside of Bradford, I have heard of no flooding conducted systematically and profitably, though occasionally one hears of individual wells or groups of wells that show profit. But this negative evidence is conclusive.

Many combinations and modifications of these three processes have been proposed. Ranney advocates a modification of the German mining method in which air pressure instead of gravity is mostly relied upon to bring the oil into the galleries.

Air has also been used by the French in the galleries at Pechelbronn, I understand, unsatisfactorily. Flooding from galleries has been proposed by John L. Rich for Bradford. My firm has and does use water to supplement the use of air or gas pressure, and at Bradford, tests are being made to supplement water flooding by air pressure.

Heat has been proposed for all three methods, but, in my opinion, it is of doubtful commercial value. Besides these proposals, others have been advanced, and the future will undoubtedly disclose many more, some of which will be exceedingly valuable.

Of the three processes, the German mining method, as applied at Pechelbronn, has given highest recovery, water flooding at Bradford next highest, the air pressure in Ohio, third. But it would be a mistake to draw general conclusions from this inadequate data, for only by testing the processess commercially, under identical conditions in many places, can a worthwhile comparison be made.

For example, water flooding has failed in a number of places where air has been highly successful, and in several instances, water has failed to displace more oil from aired sands.

Furthermore, no air property of my firm is yet abandoned, and no conclusions can yet be drawn as to ultimate recovery from most of the properties under air. How successful mining might be at Bradford, or in fields where air has been used, can not be said, nor is it known how successful air and flooding might be at Pechelbronn. It is of some significance that air pressure gave the highest ultimate recovery under laboratory conditions.

But choice of the three processes will not rest upon relative oil recovery alone, for the final test will be the comparative profits. Both mining and flooding cost several thousands of dollars more an acre than does the pressure process, and these processes must therefore recover enough more oil to extend the additional cost.

In this the pressure process has a decided advantage. On one property, at Bradford, flooding would have to recover three times as much oil as the pressure process to make equal profits. Both flooding and mining require high initial investment, and returns do not begin for many months.

Because of the greater costs and of the other disadvantages mentioned, namely hazards of life and property unfamiliar methods in mining, and the hazard of destroying property values with flooding, I believe that the industry generally will come to the same conclusion as has my firm; that is, to use pressure first, and to let the future determine what to do next.

The consolidation of pools may seem visionary, but a start has already been made in the old fields of Oklahoma, where a number of pools have been consolidated either by purchase or by agreement among the property holders.

The experiences of oil men who have gone ahead on small properties is disclosing to them the desirability of consolidation when air or gas pressure is applied. I estimate that on a 160-acre tract located in a large pool, the Independent operator will be fortunate if he gets half as much profit as could be obtained from the same property in unit operation.

Under the conception of property rights in our country, the surface boundaries are supposed to apply also to the subsoil, but oil and gas are not fixed in place and fences do not extend underground. When pressure is applied to a small property, it does not stop at the boundary, but goes across, carrying oil with it. To prevent this, vacuum may be used and the pressure kept down, but this entails unnecessary expense and a lower production than would otherwise be possible.

Often the conditions are such that independent operation is out of the question.

The air or gas will pass through an open channel to the neighboring property and unless his well can be controlled, the waste of pressure makes operation prohibitive. Many leases of 10, 20 and 40 acres are hopelessly small for independent operation. For these and other reasons not detailed, it is necessary that a pool be operated as one property for efficient recovery.

United States Uses 83.3 Per Cent of World's Passenger Autos

WASHINGTON, Feb. 20.—A report by the automotive division of the Bureau of Foreign and Domestic Commerce indicates that out of the 20,709,151 passenger automobiles in use throughout the world on Jan. 1, 1926, 17,317,357 were in operation in the United States, or 83.3 per cent of the world's total. This is 2520 per cent greater than the number of passenger cars in the United Kingdom, the nearest competitor, which had a registration of 660,734 cars on Jan. 1.

The registration of all motor vehicles, including passenger cars, buses, trucks and motor cycles on Jan. 1 this year, in the United States was 19,999,436, as compared with 25,973,928 motor vehicles in the world, which is 77 per cent of the world's total. This country also has 18,524,863 more motor vehicles, or 1356 per cent more than the United Kingdom.

An increase of 2,220,401 passenger cars, or 11.9 per cent, in the world's registrations is revealed in this report over Jan. 1, 1925. Passenger cars in this country increased 1,719,729, or 11.07 per cent over Jan. 1, 1925.

Motor vehicle registration on Jan. 1, 1926 in those countries where passenger cars in operation amount to over 20,000 was:

	Passenger Cars	Buses	Trucks	Motor Cycles	Total
Argentina	165,000	1,050	12,000	3,200	181,250
Australia	248,055	1,653	46,504	77,081	368,293
Belgium	50,270	1,000	41,443	28,464	121,177
Brazil	50,000	150	13,500	1,300	64,950
Canada	644,725	2,000	72,993	7,876	727,594
Cuba	29,000	1,150	7,500	450	38,100
Denmark	45,500	820	14,000	18,800	79,120
Dutch East Indies	33,750	300	4,000	7,000	45,050
France	450,000	35,000	250,000	120,000	855,000
Germany	215,150	500	107,350	216,830	539,830
Hawaii	22,000	25	5,000	750	27,775
India	58,363	1,700	9,064	13,610	82,737
Irish Free State	23,917	85	5,962	7,067	39,031
Italy	78,000	4,700	32,000	70,000	184,700
Japan	21,245	1,600	9,853	12,062	44,760
Mexico	31,579	400	5,845	653	38,477
Netherlands	40,500	1,800	14,000	40,600	96,900
New Zealand	81,698	1,386	13,264	24,938	121,286
Spain	65,000	5,000	6,000	3,000	79,000
Sweden	60,300	2,500	18,800	23,000	104,600
Union of S. Africa	64,450	450	4,450	24,500	93,850
United Kingdom	660,734	18,000	224,287	571,552	1,474,573
United States	17,317,357	80,000	2,446,579	155,500	19,999,436
Uruguay	20,000	200	3,400	390	23,990
Foreign countries and non-contiguous territories total	3,481,794	101,573	1,008,360	1,364,265	5,974,492
Grand total world	20,799,151	181,573	3,454,939	1,519,765	25,973,928

Economic Losses in Oil Production Are Both Oil and Capital

By Lester C. Uren
Associate Professor of Petroleum Engineering, University of California

Delivered at Federal Oil Conservation Board Hearing, Washington, Feb. 10-11

Important underground losses of oil result under our present production methods, which losses may be termed waste in that, under different methods of production, they would be in part at least avoidable, Prof. Uren brought out in his paper before the oil board. He described at length experimental work in the California oil fields to bring out losses in recovery of oil underground from early wells drawing the gas from beyond oil drainage radius, thus leaving undrilled areas in the vicinity gas drained.

He also took up capital losses resulting from over-drilling and improper spacing of wells, saying these were conducive to higher production costs to the oil companies and consequently higher oil prices.

LOSSES encurred in methods of oil production now commonly employed are first, oil losses, and secondly, capital losses. Both represent economic loss properly chargeable to the industry. Insofar as they may be avoided by improvements or changes in present methods, they represent industrial waste. Losses of crude petroleum after the product reaches the surface are not excessive, considering the low value attached to the product, the great volume that must be handled and the widely scattered points of production. The important losses of oil are underground losses.

Such losses are deceptive in that they are not apparent from surface inspection, and the oil producer may actually be losing upwards of 75 per cent of the oil within his property boundaries without becoming aware of it. We are not here concerned with the losses of one operator of a group to his neighbors by failure to keep pace with surrounding development, but rather, with the over-all loss of oil which is left in the sands unrecovered.

Recover 25 Per Cent

It is now generally admitted that the present commonly-used methods of production are securing less than 25 per cent of the oil actually present in the reservoir sands. Some authorities placed the extraction as low as 10 or 15 per cent in certain fields. Some believe that the remaining 75 per cent or more that we fail to produce by present methods is not lost, but may yet be recovered in the future by more efficient processes yet to be developed.

While it is true that processes are known—such as water flooding and the application of compressed air to the sands—which may be applied when the lower limit of production by flowing and pumping is reached, there is no assurance such processes are of universal application. Furthermore, present-day operations are often conducted in a way that leaves the productive sands flooded with water, or sealed with solidified asphalt of wax; so that the remaining oil will probably not be producible by any known process of recovery.

—Underwood & Underwood
Lester C. Uren

This loss is probably the most serious one with which the present-day oil industry may be charged because it is largely remediable through the use of more efficient methods of recovery already known to the industry; but not used because the highly competitive system of production of today does not permit production of anything but the cheapest oil, necessitating the use of methods which give little regard to ultimate recovery.

Maintain Gas Pressure

There is ample evidence indicating that, if the gas associated with the petroleum were conserved and elevated gas pressure maintained in the oil sands during their productive life, the ultimate production of petroleum could be greatly increased. It seems probable we could increase the percentage of ultimate recovery and greatly extend the radius of drainage of wells if we were to drill them of larger diameter or excavate cavities about them within the oil sands.

Much oil left in the sands as unrecoverable is lost through lack of uniformity in field development programs of competing producers. For maximum recovery, timely drilling of all areas within gas-drainage radius of each other is essential. The early wells in a new field are usually far more productive than later drilled wells, because they have the advantage of higher gas pressure. They secure their production, however, only at the expense of gas from oil beyond oil-drainage radius, thus leaving undrilled areas in their vicinity gas-drained. Later-drilled wells in these areas recover only a fraction of what they might if drilled before gas drainage occurred.

Data gathered some years ago in the California Naval Reserves indicated that delay of only a few months in drilling locations within gas-drainage radius of earlier drilled wells, means in many cases, a loss of upwards of 50 per cent of the potential production. Delay of a year or two often reduces the ultimate production to as little as 25 per cent of what it might have been with timely drilling. These losses are entirely due to gas drainage, the oil being deprived of its gas and left in the sands without motivating force to bring it into the wells.

Loses Due to Gas Drainage

I have determined the ultimate loss for a group of 101 wells in the Coalinga Field of California, due to delayed development, and find that about 26 million barrels of oil have been left in the sands about these wells as a result of untimely drilling. If this group of wells can be considered as a fair indication of the average well in the Coalinga Field there has been a total loss for the field of about 360 million barrels. If all the wells within the California fields had the same ratio of loss to yield, the loss would be 2,700,000,000 barrels. These figures are at least indicative of an economic loss of great magnitude. They could be greatly reduced by better coordination of the development program in our producing fields, so that all wells would receive the greatest possible benefit of the higher gas pressure.

Important under-ground losses of petroleum also result through failure to adopt a uniform policy of water exclusion and a proper system of control of

a Library of
OIL MARKET PRICES

GET your copy of the 1925 OIL PRICE HANDBOOK at once. When the present supply is gone, no more will be printed.

The 1925 price-volume gives you (1) Refinery markets; (2) Tank wagon and service station prices; (3) Crude oil prices; (4) Export markets for New York, Gulf and Pacific Coast; (5) Up-to-date Refinery Directory of all plants in the country.

Also vital statistics on (6) Crude production and stocks by districts monthly in 1925, and yearly figures through 1918; (7) Refinery production and stocks of gasoline, kerosene, gas and fuel oil, lubricating oils, wax, showing monthly output by districts for 1925, and yearly tables through 1918; (8) Natural Gasoline production and stocks by refining districts for 1925, and yearly totals by states through 1918.

The 1925 OIL PRICE HANDBOOK is cloth-bound —marginal index—complete for 1925—Price $5.

Send for your copy today

OIL men everywhere have welcomed this compilation of a year's prices in one handy volume. Those who used the 1924 price-book have urged us to publish each year's oil markets in this way, so that ten years from now every oil man will have a **LIBRARY OF OIL MARKET PRICES** over a period of many years for quick reference.

"It will be worth ten thousand dollars to me then," said a veteran oil man who knows the value of having quick access to back prices.

NATIONAL PETROLEUM NEWS, Date_____
808 Caxton Bldg., Cleveland, Ohio.

Send_____copy (or copies) OIL PRICE HANDBOOK for 1925 and Refinery Directory—price $5, less 5% discount for three copies; 10% discount for five copies or more.

Enclosed is check for $_____.

Name _____City _____

Address _____Company _____

edgewater encroachment. Many wells are prematurely flooded before they have had time to secure the oil they might produce. Much oil is lost in lenses of slow-draining, fine-grained oil sand that becomes inundated by encroachment of water through surrounding coarser sand channels. The only remedy would seem to lie in closer study of subsurface conditions and in the adoption of uniform methods of water exclusion and well control.

So much for the under-ground oil losses that result under the present system of production. It is apparent that our production methods are notably inefficient and productive of important economic loss. The losses may, in part, be properly termed waste, in that they would be partially avoidable if different methods of oil production, already known, could be adopted.

Capital Losses

In capital losses, we are again confronted with conditions productive of serious economic waste. There are those who argue that, if oil producers choose to drill more wells than productive acreage will properly support, it is their own business; that oil is not actually wasted by so doing, and that the consumer should rejoice in the low oil prices resulting.

In a broad view, the losses of an industry must ultimately be paid by the consumer. To perpetuate itself, any industry must, in the main, be profitable, and over-all profits cannot be determined without taking losses into account. Capital losses in the oil-producing industry are therefore conducive, in the last analysis, to higher oil prices.

Inefficiency in this respect, is also productive of higher production costs, and higher production costs compel a lower percentage recovery of oil. Efficiency in the conduct of oil-producing enterprises means lower production costs, which permit operating wells for lower daily yields, resulting in greater ultimate recovery of oil from our productive sands. The efficiency of the oil producer is therefore a matter of concern from the conservation standpoint.

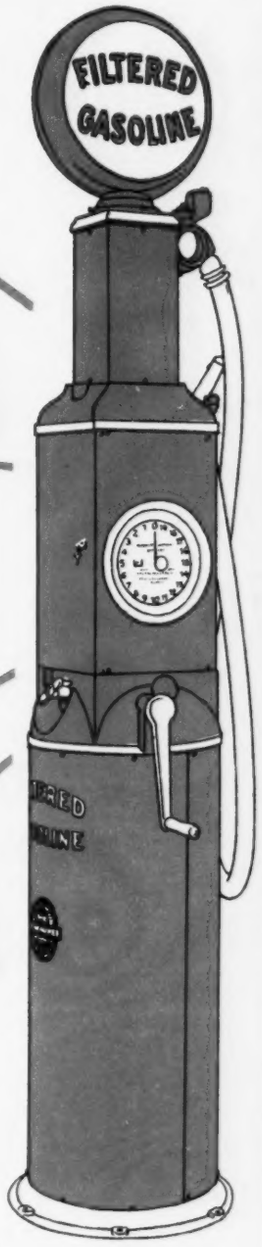
Over-Drilling

One of the most serious sources of capital waste results from over-drilling and improper spacing wells. The industry has not yet developed a method of determining the economic spacing of wells. Practice in spacing and arrangement of wells varies widely, and in most cases, locations are determined by property boundaries and competitive conditions rather than by the principles of drainage and economics.

In the Santa Fe Springs field of California, for example, of 1400 acres productive area there are 45 different oil companies operating. They have drilled some 340 more wells than the field should properly support at an average cost of $100,000 or a total loss of about $34,000,000. In their competition for early production they increased the monthly production from one to ten million barrels in twelve months, and as a result, 96 million barrels of oil were

The Real Piston Pump
Watch These Features

1. Automatic piston return—continuous forward pumping. No gear train.
2. Weather-proof construction—fully enclosed. About half the usual number of parts.
3. Two 20 gallon dials under glass. The finest and most accurate meter.
4. Great speed—delivers more gas per crank revolution.



The climax of fourteen years' steady development

Milwaukee Type 364

Other features: Lock in meter, filter, adjustable stops, visible flow indicator, operating parts easily accessible. This accurate, durable pump, through volume production, is priced unusually low. Write for details and prices.

MILWAUKEE TANK WORKS
Milwaukee, Wisconsin

MILWAUKEE TANK WORKS

HEADQUARTERS for STATION EQUIPMENT

Sell
Keen & Woolf
Lubricating Oils

Because

They back up your sales promises with real performance and build up your trade.

KEEN & WOOLF OIL CO.

Refiners for Jobbers Houston, Texas

COUPON BOOKS
of Every Description
for the Filling Station

We will gladly send samples and prices upon request

Allison Coupon Co.
Indianapolis Indiana

sold for $1.35 per barrel, less than the prevailing market price just before and after the peak of production, a further loss to the industry of $130,000,000.

It is cheaper to produce oil on large tracts under unified control than on small tracts under separate management. It has been estimated that the average cost of oil production by the many different companies operating in the Santa Fe Springs field, has been about 40 cents a barrel higher than if the entire field could have been operated under a single management. This represents an additional loss on the 136 million barrels already produced in this field of about $54,000,000. The total of these various losses is about $218,000,000.

In the scramble for early flush production from the deeper zone in this field, two upper zones were only partially depleted, but gas pressures were promptly dissipated and the upper sands are now said to be flooded in many localities.

Had the three oil zones in this field been drained one at a time, beginning with the uppermost, and gas pressure preserved by proper gas conservation, it is probable that this field would have produced at least twice as much oil as by present methods.

Effect of Competition

We find the same inefficiencies represented in greater or less degree in nearly every oil field. As long as the competitive system prevails we must expect these losses. The American public may not like the idea of integration in industry, and it may be contrary to present anti-trust laws, but real conservation of our petroleum resources is possible by consolidation of producing interests, the ideal organization being attained only when each producing structure is controlled by a single operating unit or an association of producers under unified control.

The small producer is an economic misfit in the oil industry. He seldom attains any degree of efficiency in production technique. Lack of adequate capital often compels him to produce and sell oil in excess of the legitimate needs of the consuming industries, demoralizing markets and compelling others to match his ill-advised efforts, leading at times to large quantities of oil being sold below the cost of production. Such circumstances also breed wasteful conditions in the oil-consuming industries.

An economic study of the California petroleum producing industry made a few years ago by the Federal Trade Commission indicated that the average large producer (with an output of 1,000,000 barrels or more per year) is able to produce oil for 43 cents per barrel with a capital investment of $2.79 per barrel of annual production; while the oil produced by the average small operator (having an output of less than 50,000 barrels per year) under similar conditions, costs $1.21 per barrel and the capital investment per barrel of annual production is $10.52.

BUDD-MICHELIN Dual Wheels for swift, sure economical deliveries

PUT your trucks on a cushion of air, and you increase their speed and lengthen their lives.

One truck and one driver can cover more distance in a day—make more calls—and both truck and driver will come back feeling better.

That's economy and that's service and that's good sense.

Budd-Michelin Dual Wheels make it possible for trucks of any reasonable size, and loads of any reasonable weight, to ride on air.

The heavy bus industry—where gigantic buses travel at express-train speed and are almost always overloaded—has shown the way. They average from 15,000 to 20,000 miles from a set of regular size pneumatics on Budd-Michelin Dual Wheels.

Traction? Sure! Cushions of air that dig *out* of mud and sand, instead of digging in.

Truck manufacturers will supply new jobs on Duals and pneumatics—and your present trucks can be converted. Write us for the experience of others.

BUDD
WHEEL COMPANY
Philadelphia

The Budd-Michelin equipment—two Budd-Michelin single wheels in front, two Budd-Michelin Dual Wheels in the rear (pairs of single wheels acting together as units). All wheels completely interchangeable either as units or as halves of Duals. One spare.

How the One Car Owner Benefits by Q. D. A.

MILWAUKEE Feb., 20.—How the ordinary motorist with only one automobile can get the benefit of the quantity discount prices made by Standard Oil Co. of Indiana and other large distributors, was explained here by Victor F. Pettric, secretary of the Wisconsin state Motorists Association.

Mr. Pettric came to Milwaukee Feb. 11 to testify in the hearings of the state Department of Markets in regard to the workings of the Q. D. A. He explained his system in private conversation to National Petroleum News, however, not on the stand.

Mr. Pettric issues to each of his members a coupon book, prepared by the association. The coupons in the book are in the same denominations as American coins and resemble the ordinary oil company coupons in appearance. Their purpose is entirely different however. They do not come from the oil man but from the association to which the motorist belongs. And, moreover, they come free for the price of publication which is nearly "nothing apiece" when printed in large volume.

The motorist takes his coupon book with him everywhere he drives his car. When he buys gasoline he pays 10 per cent of the bill in association coupons. Say he buys a dollor's worth of gasoline; he pays the service station attendent 90 cents and gives him a 10-cent coupon from his book of bright-colored script. Of course the service station attendant will not take it unless he has been instructed to do so by his employer, but Mr. Pettric takes care of that arrangement in advance for his members.

After the oil jobber has accumulated a large volume of these coupons he has them totaled on an adding machine and sends them to Mr. Pettric's office, accompanied by a bill. That is, he bills the Wisconsin State Motorists Association for the amount of gasoline he has delivered to its members upon association coupons. But does the association pay for that gasoline?

There is the cute trick. There, indeed, is where the discount comes in. There is where the Q. D. A. gets the famous "horse laugh".

When Mr. Pettric gets $100 worth of coupons and a bill for $100 along with it, he sits down to his desk and bills the oil man right back again for $100 worth of advertising.

And why call it advertising?

"Because", Mr. Pettric explains, "it turns business into the oil man's stations". Motorists buy from the oil man who recognizes their coupons for three reasons, (1) because he is loyal to his motor club, (2) because he is glad to patronize an Independent oil man who runs a home institution, and (3) because the gasoline is 10 per cent cheaper there than elsewhere.

Standard Oil Co., and several of the major Independents in Wisconsin, turned down Mr. Pettric's proposition when he brought it to them. But some of the Independents accepted it. Some of them, according to Mr. Pettric, are members of the Wisconsin Independent Oil Jobbers' Association.

Cincinnati Club Employs Credit Man Secretary

CLEVELAND, Feb. 20.—The oil men of Cincinnati are so convinced of the value of association work as a means of preventing spread of unethical trade practices and consequent ill feeling in the trade that the Cincinnati Oil Club has employed a part time secretary to look after the members' collective interests. He is R. K. Chapman who operates the Cincinnati Retail Credit Agency.

Besides acting as an arbiter in any disputes that may arise, Mr. Chapman also is credit man for the oil trade. He keeps a classified index of the credit standing of every user of petroleum products in the Cincinnati district. Mr. Chapman has access to the books of members of the club and if any should slip from a policy of sound business, it is his duty to tell them so—and tell them quickly. Members of the club commend the arrangement.

Lots of Red-Haired Ladies Here, Oil Company Finds

EL PASO, TEX.—Red gasoline served free of charge to red-haired women motorists was the opening day attraction at the new service station of the Calumet Oil Co., on Mesa and Montana Sts.

Several "teaser" advertisements were carried in local newspapers, one of which stated: "Wanted—to meet a certain lady with red hair, at the corner of Mesa and Montana Sts., Saturday afternoon at 2". It was signed by the man who was to have charge of the station. Other similar advertisements addressed to red-haired women, appeared each day until the day before the opening. The last one invited every red-haired woman in town who drove a car to come to the station for red gasoline, five gallons of which were to be given away free to each one.

The station was crowded all afternoon with red-haired women and with others who had come to see the fun.

The red gasoline marketed by the Calumet company is a benzol blend colored red. It also markets Crystal gasoline, its regular grade, according to Dick Blue, Sales manager.

MAYBE THEY'D BOTH BETTER HURRY

The Editor's Viewpoint

National Petroleum News

Taxation is Confusion

THE ever present evil of taxation is brought forcibly to the attention of the petroleum industry in a situation now confronting corporations doing business in Texas. It has to do with a decision handed down by the Supreme Court of the United States in what is known as the Archer county case, holding the road bond issue of $300,000 invalid because the general law was found to violate the Fourteenth amendment to the Constitution which guarantees "due process" of law as a pre-requisite to levies.

An effect of the decision is to bring into question the validity of all the special road districts created in Texas under the general law; and, of course, it follows that bonds issued and sold throughout the country by these districts are similarly affected. In a few instances, oil companies have paid tax levies made by road districts formed after the manner of the Archer county district now declared to be invalid. Others will refuse to pay on the ground they cannot pay these taxes without hazarding the chance of having to pay them again.

Attorney General Moody has issued an opinion, meantime, holding that corporations have the right to pay all other taxes except road district taxes, withholding the latter; and the comptroller finally has given an opinion that county officials may accept other taxes when the payment of road district excises is withheld.

It is interesting to note, however, that in one instance a road district created in a manner similar to the one declared illegal had, through its officials, continued to levy and collect the tax after getting in enough money to liquidate both bonds and interest.

The Texas legislature has the power to validate bonds brought into question by the Supreme Court decision and very likely it will do so. Corporations and others who stand to pay the taxes are making no fight against such a procedure, but generally they are not hazarding the chance of having to pay the taxes more than once.

Natural procedure under legislative "curing" of the situation would be to levy ad valorem taxes to pay the interest and create a sinking fund. When such a validating act goes into effect the tax, being an ad valorem tax, must fall equally on everyone, regardless of whether some taxpayers have voluntarily paid their part at an earlier time or not.

It has been estimated that a sum equivalent to one half the net profits of certain oil corporations goes to liquidate taxation against them every year. This situation reaches its climax under conditions wherein oil companies are assessed substantially full valuation in matters of taxation, which is double and treble the amount assessed against other tax payers.

Special taxes paid by oil companies begin with an excise on crude oil production. Next come the ad valorem state and county taxes. Then come district taxes and finally gasoline sales taxes. Besides a large tax is levied and paid on every truck or automobile owned by a company, to say nothing of federal taxes which must be considered additional to state, county and district levies.—P. W.

Not a Guarantee of Efficiency

DAILY we get testimony from men of authority that great size to business is not a guarantee of great efficiency—that size may even insure a certain amount of inefficiency, as well as higher costs.

Speaking against mandatory consolidation of railroads the other day, Chairman Eastman of the Interstate Commerce Commission said:

> "The country ought not to be led into the belief that great consolidations of railway property involves any probability that the general level of freight rates may be substantially reduced.
>
> "Economy and efficiency of operation are much more than a matter of size. There are small railroad companies which are as economically operated as any of the great railroad systems. It still remains a question how far a single management can with advantage be extended over railway lines.'"

All of which may be said with equal force of oil and other industrial companies. Some executives of big oil companies realized this and have been battling courageously and intelligently against the decreasing efficiency due to their great size, and they are not at all satisfied with what success they may have achieved.

They look across the fence and see the small oil company, with a wonderfully simple, and hence inexpensive, problem of management, steadily making gains in gallonage, even often at better prices than the big company charges.

The type of stock selling broker who likes to call himself "banker" points loudly to the "value" of consolidations, because he must have stocks to sell or seek other employment, but the operating officers of many a consolidation made for "efficiency only" can tell you a sad tale.

The individual is still the dominant factor in this country, and will be for a few more centuries at least.—W. C. P.

Labor Without Compensation

AN income of $12,000,000 on $4,100 expenses a year! How does that read to an oil man who scrambles to keep his books out of the red? But that is what the state of Ohio is doing. It is collecting approximately $12,000,000 a year as gasoline taxes on an appropriation of $500 for office furniture and supplies and $3,600 for operating expenses.

But the sum appropriated for operating expenses is insufficient and the state tax commission admits it is drawing from other divisions to meet a deficit in the gasoline division, even though the oil companies get no allowance for their services as collectors. Undoubtedly the oil companies are paying out many thousands of dollars, perhaps ten times as much as the state in gathering the gasoline nuisance levy. Not only is the collection a nuisance, it is an unjust requirement that Ohio, or any other state, should make its tax collectors work without compensation. The oil industry is a business, not a philanthropy.—R. B. S.

Billions of Barrels of Shale Oil Are Available at Cost of $1 a Barrel

By Karl J. Schuyler
Denver

Delivered at Federal Oil Conservation Board Hearing, Washington, Feb. 10-11

THE cost of mining coal, due to turbulent labor conditions, the difficulties of working underground, etc., is comparatively very high. I believe it is generally accepted that coal cannot be processed exclusively for its oil content; that the amount of coal that can be processed depends upon other resulting products such as coke, the market for which would be quickly glutted.

Oil shale, on the other hand, is subject to no such limitations, and vast bodies are available which will produce approximately one barrel of crude shale oil to the ton of raw oil shale.

So that you may have an idea of the character of this shale oil, below is an analysis made by the Ventura Refining Co. at Fillmore, Cal., from a sample of shale oil produced from Colorado shales by means of a semi-commercial retort in Denver.

Bottoms contained more wax and less asphaltum than a 13° gravity bottom from petroleum. Bottoms were like unto those of a highly cracked petroleum fuel oil, being somewhat less viscous than a 13° gravity heavy tar. A sulphuric acid treatment of these bottom resulted in 8 per cent sludge loss.

It is estimated that there are 394,343,819,000 tons of oil shale in the United States, averaging about 11½ gallons per ton, making a total theoretical recovery of 108,424,810,000 barrels of oil.

I shall not promise any part of my discussion upon the total recoverable content of all of our oil shale. I refer only to those easily workable, above ground, exposed seams which I know about, which are about 50 ft. thick, from which about 120,000 barrels to the acre may be produced, and which extend over a known area of several thousand square miles.

Shale Oil at $1 per Barrel

It is respectfully submitted that shale oil can be produced from this vast body of shale in projects of from 10 to 50,000 barrels per day, at approximately $1.00 per barrel. Considering that the average cost of well oil in the United States is probably somewhere between $2.50 and $3.00 per barrel, it will be readily appreciated that if shale oil can be produced for $1.00 per barrel, it is profitable competition.

Before I state the reason for my belief that $1.00 per barrel shale oil is now possible, let me briefly answer a few of the objections of the shale oil critics:

There are almost unlimited quantities of oil shale in the United States with a potential content of more than 108,000,000,000 barrels of oil, according to the statement made to the board by Karl J. Schuyler of Denver.

Mr. Schuyler estimated that the mining of this shale would be simple and inexpensive as compared with the mining of coal and that it would be subject to none of the labor troubles that vex the coal mining industry. His estimate, which he said was based on the figures of reputable mining engineers, was that the cost of producing the oil would run about $1 a barrel.

His suggestion was that the conservation board make recommendations to the oil industry that its technologists launch a comprehensive campaign, assisted by the government bureaus equipped for the work and financially by the companies that make shale oil extracting, mining and refining equipment, to determine just what possibilities lie in the shale deposits of the country and how they can best be realized.

I have heard it said that a shale oil plant producing 1000 barrels a day would not keep a single battleship in motion. Let that be granted. I am not talking about a 1000-barrel oil shale plant. I am talking about the exploitation of shale oil fields in the same way that we talk about the exploitation of well oil fields.

If it is true, however, that it will take a long time to develop the industry, and if there is good reason for developing the industry, the quicker a start is made the better. It would be crass foolishness to wait until war or other emergency flaunts our short-sightedness.

The statement is heard that it will cost $4.00 or $5.00 per barrel to produce shale oil. I have no doubt that a pilot plant operation could easily run its costs up to such a figure; but again we are not considering the costs of the first pilot plant operation, involving, say one hundred barrels per day output—the losses of that operation will be absorbed in subsequent large scale production.

Shale oil in competition with well oil will have, among others, these distinctive advantages:

Shale oil cannot be drained, and hence there will be no end-line battles with their attendant waste. The business can be expanded or contracted to meet demand and price. The shale oil content of a given area, due to its uniformity, can be calculated almost to the barrel.

The economic loss resulting from different ownerships of the producing fields and the refineries, and arising out of the distance often separating the two, would be obviated by reason of the fact that the refining end of the shale oil business will be an integral part of the whole operation—there being always a sufficient supply of oil in sight to justify the location of a refinery with reference to the particular oil shale project, rather than with reference to a number of scattered, short-lived well oil fields.

The principal items of cost are mining and retorting.

Items of Cost

I believe it will be conceded that if the mining cost can be held in the neighborhood of 50 cents a barrel, that the entire cost will not be over $1 a barrel.

In Scotland the cost of retorting is roughly one-third of the cost of mining.

Looking at the problem some time ago from the standpoint of a layman, I came to the conclusion that there was a reasonable chance, in large scale

Analysis of Colorado Shale Oil

Sample Submitted by W. S. Skinner
May 5, 1925

Gravity of Crude 32.8 deg. Baume
Sulphur 0.978

Product	Gravity °Be.	Vis. 100°F	Cold Test	% From Crude
Gasoline (From 40% Tops. 45.3° Baume Gravity, Treated)	51.0			23.0 (425°F EP)
Kerosene	34.0			28.0
Gas Oil	29.0			10.0
Paraffin Distillate	24.4	62	56°F	22.0
Fuel Oil (Bottom)	13.0			7.0
Loss in form of sludge				8.8
Distillation Loss				1.2
				100.0

projects, of a mining cost of 50 cents a ton. I came to that conclusion because they are mining about 40,000 tons a day of low-grade copper ore by open-cut steam-shovel methods in Utah, at a cost of about 22½ cents a ton.

Studies that have come to my attention by coal mining engineers indicate with a sufficiently large area for exploitation, with proper thickness and lay of seam, with the mine laid out today in the light of present knowledge, and employing the maximum of modern mechanical equipment, such as electric loaders and conveyors, et cetera, that coal could be mined underground in operations involving 1000 tons a day for approximately $1.00 per ton.

Above Ground Shale Mining

I figured that shale mined above ground through an exposed escarpment, could be mined at a cost somewhat exceeding the open-cut, steam-shovel costs, and at a cost considerably less than the underground coal mining cost, for the reason that shale is a tough substance and has much easier wall and roof support problems than coal; its stratigraphy is almost perfect for mining; the operations being carried on above ground, there would be excellent ventilation and comparative freedom from the gasses that make underground mining so dangerous and that add so heavily to its costs; that the turbulence characterizing labor conditions in coal mining could be avoided, and, likewise, the high cost of coal due to the seasonal character of the industry. Shale mining, starting fresh, would be free of many of the traditional obsolete methods now attaching to coal mining.

Since I came to that conclusion, Messrs. Carroll and Debeck, experienced and reputable mining engineers of Colorado, have made a thorough study of the mining costs of shale for one of our large well oil producers, and have concluded that by the caving method the mining cost will be 60 cents per barrel of oil.

I accept those figures because they do no great violence to my own conceptions, and because they have been gotten out by men who have spent their lives as mining engineers and as operators of mining properties.

The retorts will be mechanically charged and emptied, and will, as far as possible, be under automatic heat control. The operation will produce its own heat and power. There is no exact precedent for this cost. I estimate it as 10 cents per barrel. It may go somewhat higher, but it seems reasonable that the remaining 40 cents before $1.00 cost is reached, ought to cover retorting, whatever rough crushing is required, overhead, interest, depreciation, etc.

If the Federal Oil Conservation Board believes there is a fair chance of producing shale oil in competition with well oil, either now or in the reason-

When the buyer's eyes view your samples

—are the visible qualities of your oil displayed to the best advantage? You know your product is good, but it is up to your sample to persuade the buyer to investigate those invisible qualities which will prove its goodness to him.

Our Sample Oil Bottles are blown from the finest flint glass, so their crystal clear walls show the color and flow of the oil perfectly. Their square shoulders and even, seamless sides give them an efficient, clean-cut appearance which adds much to their selling power.

Write us for a free sample and see for yourself how attractive your oil will appear in one of these bottles.

Illinois Glass Company

Established 1873

ALTON ILLINOIS

Available in 2 oz., 4 oz., and 8 oz. sizes with ground and polished bottoms when specified.

EMPIRE
is a
dependable
source
of supply
for all
kinds of
Petroleum
Products

CITIES SERVICE OILS
ONCE-ALWAYS
EMPIRE
REFINERIES INC.
SUBSIDIARY CITIES SERVICE CO.
GENERAL SALES OFFICES-TULSA, OKLA.

CHICAGO NEW YORK PHILADELPHIA CLEVELAND
ST. LOUIS ST. PAUL KANSAS CITY ATLANTA
NEW ORLEANS FORT WORTH TORONTO

Used Oil Equipment

If you want to buy it—turn to the classified advertising page at the back of this issue. If what you want is not listed there, why not insert an advertisement of your own next week?

If you want to sell it—follow the same course.

There is a constant market in used oil equipment. Take advantage of the great savings possible, either by selling what you no longer need or buying what you do need.

National Petroleum News
892 Caxton Building Cleveland, Ohio

ably near future, then it is respectfully suggested that this board recommend to the oil industry and to allied and dependent industries, that the experiments and the work necessary to determine the matter one way or another, be set in motion on a comprehensive, adequate and conclusive scale.

Let the organization selected to do the job bring from Germany and Scotland and other countries where shale has been produced, the best available experts in the business, put them to work, co-ordinate their efforts; establish an active and friendly co-operation with the United States Bureau of Mines and with the United States Navy; make a thorough survey of the entire field of knowledge presented by experiment and experience; cull the useful from the useless; estimate what theoretical work remains to be done, and have it done; go into a shale mountain and break down and move enough shale to establish formulas for mining costs; construct a pilot plant which will reflect the final theoretical findings, and keep working at it until it is practical, efficient and economical.

The cost could be borne by the interested operators; by dependent industries; by those who will furnish powder and supplies of various kinds to the new industry; by the States; by the land owners concerned.

Existing patents ought to be examined, and patentable results from the work carried on ought to be made exchangeable among the contributors. The effect should be headed by a man whose reputation for large, constructive technical achievement, is so definitely established as to command the confidence of the industry, the nation, and those experts whose efforts he will have to direct and co-ordinate. I believe the undertaking could be fired with much the same zeal, earnestness and enthusiasm that characterized the efforts of American engineers in the evolution of the Liberty motor.

The encouragement by your board of such an enterprise would not be a radical innovation in governmental affairs. The crisis in the nation's rubber supply has, if press reports are correct, induced Secretary Hoover to take a leading position in bringing our rubber consumers together, getting them organized for raising the vast sums required to assure a definite and certain supply of that important product.

COLUMBUS, O.—At the recent auto show here the Pure Oil Co. displayed five Pierce-Arrow and Reo gasoline trucks, which had been repainted in its Columbus shops. Each one of these cars had been driven from 35,000 to 45,000 miles before they were reconditioned. Judging from the attention they received from the public and from newspapers, they were apparently believed to be new cars, according to Charles A. Ward, editor of "Pure Oil News."

Boyce & Veeder Drop Damage Suit Against the N. P. M. A.

CHICAGO, Feb. 19.—Boyce & Veeder Co., (manufacturers and marketers of Boyce-ite, a widely advertised motor dope to be mixed with gasoline as a means of eliminating automobile carbon trouble), have abandoned their million-dollar damage suit against the National Petroleum Marketers Association.

The case started more than a year ago as a result of an article that appeared in the association confidential bulletin, prepared by President L. V. Nicholas, in which he gave chemical analyses of some of the motor tonics, including Boyce-ite.

First Boyce & Veeder brought suit for $1,000,000 alleging libel. This allegation was thrown out in the Superior Court of Cook County, Ill., on the grounds that a company cannot be libeled, as can an individual. This decision was taken to Appellate Court. Excerpts from two recent issues of Mr. Nicholas' circular letter are self-explanatory and show how the litigation happened to end. The first is from the issue of Jan. 30 and the second from the issue of Feb. 13. They follow:

Status of the Boyce-ite Suit

"We are receiving enough inquiries as to the status of the suit brought against us by the proprietors of Boyce-ite and also as to our opinion of the merits of Boyce-ite to justify a statement at this time.

"Up to date, the preliminary court skirmishes have been decided in our favor. The matter is now pending an appeal in the Appellate Court, and will come up for hearing some time the early part of the year. What the ultimate outcome will be no one can predict.

"Our position is this: We submitted what we believe to be an impersonal and unbiased report of the chemist who had analyzed every motor dope submitted to us up to that time. The Boyce-ite proprietors feel our chemist was prejudiced in his report.

No Aspersions Cast

"The Boyce-ite people seemed to believe that we cast aspersions on their business integrity. This, we deny. To the best of our knowledge Boyce-ite manufacturers believe in their product, and are men of business integrity and standing.

"They also apparently believe that our report on Boyce-ite stated that upon combustion it produced nitric acid. What we did state was that according to our chemist's analysis it contained 40% nitro-benzol, and one of the products of the combustion of nitro-benzol is nitric acid. We made no statement relative to the production of nitric acid by Boyce-ite, and we did not and do not claim that Boyce-ite is injurious to a motor.

"There are members of our organization who have sold Boyce-ite from the time it was first put on the market up to the present time, and they are enthusiastic users and exponents of Boyce-ite and its value. Other members are not —but, as Mark Twain said: 'Differences of opinion make horseraces.'

"This explantory statement of our actual position in the Boyce-ite matter must not be construed as a recommendation."

The Boyce-ite Case

"We have received this morning a most interesting letter from Mr. W. Covert Jones, vice-president of Boyce & Veeder, which we quote in full:

"'We have noted in your bulletin of January 30th, 1926, a statement to the effect that your comments on Boyce-ite, for which we have sued you for libel, were not intended by you to reflect upon the integrity and honesty of its manufacturers; that you did not intend to insinuate that Boyce-ite was harmful to internal combustion engines, that some members of your organization are enthusiastic exponents and users of Boyce-ite; but that you do not recommend it.

"'Inasmuch as we desire no recommendation of our product from you or your association, we believe your foregoing statement removes all cause for continuation of the law suit. We have, therefore, instructed our attorneys to dismiss the appeal.'

"We would be lacking in frankness if we did not say that we appreciate very much the spirit of this letter, and are glad we can still have our distinct differences of opinion without involving the personal integrity of those with whom we disagree."

(Signed) L. V. Nicholas, President.

Ratio Gasoline Shipments to Production

Staff Special

TULSA, Feb. 19.—H. K. Davis, statistican of the Western Petroleum Refiners Association, has prepared an interesting table which shows stocks of gasoline in all districts of the United States at the beginning and end of 1925, together with total production and shipments of each district for the year. The table also gives the relationship of stocks, production and shipments of each district to the total for the United States.

The table shows that only three districts shipped more gasoline than they produced during the year. They were, Oklahoma-Kansas, North Louisiana-Arkansas and California. The Mid-Continent field as a whole, including north Texas plants shipped 99.87 per cent of the gasoline produced.

Figures in Percentage Columns are Per Cent of Totals, United States

	Stocks				Production		Shipments		
	Jan. 1 (Gallons)	%	Dec. 31 (Gallons)	%	(Gallons)	%	(Gallons)	%	Ratio Shipments to Prod.
East Coast	204,437,819	15.79	337,629,000	20.48	1,744,120,239	16.08	1,610,929,058	15.35	92.36
Appalachian	26,672,169	2.06	32,328,000	1.96	426,470,248	3.93	420,814,417	4.01	98.67
Ind.-Ill., Etc	159,148,566	12.30	175,418,000	10.64	1,461,600,421	13.47	1,445,330,987	13.77	98.89
Okla.-Kans., Etc	121,042,101	9.35	118,546,000	7.19	2,015,095,692	18.57	2,017,591,793	19.22	100.12
No. Cent. Texas	18,021,818	1.39	24,550,000	1.49	564,333,573	5.20	557,805,391	5.32	98.84
No. La.-Ark	4,907,134	0.38	4,352,000	0.27	130,966,302	1.21	131,521,436	1.25	100.42
Texas Gulf	136,393,137	10.54	179,764,000	10.91	1,667,151,745	15.37	1,623,780,882	15.47	97.40
La. Gulf	81,068,320	6.26	206,242,000	12.51	498,852,727	4.60	373,679,047	3.56	74.91
Rocky Mt	115,836,469	8.95	164,283,000	9.97	611,654,238	5.64	563,207,707	5.37	92.08
California	426,944 467	32.98	405,216,000	24.58	1,728,882,522	15.93	1,750,610,989	16.68	101.26
United States	1,294,472,000	100.00	1,648,328,000	100.00	10,849,127,707	100.00	10,495,271,707	100.00	96.74
Mid-Continent	143,971,053	11.12	147,448,000	8.95	2,710,395,567	24.98	2,706,918,620	25.79	99.87
Gulf Coast	217,461,457	16.80	386,006,000	23.42	2,166,004,472	19.97	1,997,459,929	19.03	92.22

Attack Petroleum Rates From Southwest

WASHINGTON, Feb. 20.—Fayette B. Dow, W. W. Klingensmith, Willis Crane and Harry S. Elkins, as attorneys for the Transcontinental Oil Co., have begun their promised attack upon railroad freight rates on petroleum and its products from the southwest to the southeast, recently foreshadowed in the National Petroleum News.

Specifically they have attacked the rates from Bristow and Boynton, Okla., and Fort Worth and Hodge, Texas, to destinations in all the states east of the Mississippi and south of the Ohio and Potomac rivers as unjust and unreasonable. The complaint is against the rates on all products but particularly applies to those on gasoline, from and to points as follows:

To (Destination Points)	From (Origin Points)	
	Fort Worth, Texas Hodge, Texas Boynton, Okla. Bristow, Okla.	
(Rates in cents per 100 pounds)		
Oceala, Fla.	101.5	111
Birmingham, Ala.	51	55.5
Albany, Ga.	62	70
Augusta, Ga.	67.5	73.5
Columbus, Ga.	58.5	64.5
Macon, Ga.	62	68
Waycross, Ga.	67.5	77
Asheville, N. C.	70	69
Gastonia, N. C.	70	74
Hickory, N. C.	71	74
Burlington, N. C.	72	76
Winston-Salem, N. C.	72	76
Wilmington, N. C.	72	77
Raleigh, N. C.	72	77
Abbeville, S. C.	72	72
Columbia, S. C.	72	77
Greenville, S. C.	67	72
Rock Hill, S. C.	70	74
Sumter, S. C.	71	75
Jefferson, S. C.	71	76
Concord, N. C.	71	76
Chattanooga, Tenn.	51	57
Jackson, Tenn.	45	40
Knoxville, Tenn.	64	62.5
Danville, Va.	72	76

The complaint of the Piedmont Oil Co., of Gastonia, N. C., against rates from Fort Worth and Hodge was dismissed by the Interstate Commerce Commission because, it is said, it was not broad enough to cover the whole adjustment. To make sure that the complaint of the Transcontinental would be broad enough to cover the whole situation, the attorneys, in addition to the specific attack upon the rates from and to the places mentioned in the preceding paragraph, mentioned other points in every one of the southeastern states to which the Transcontinental had shipped petroleum products, alleging the rates to those points were unreasonable.

No action has yet been taken by the freight rate regulating body upon the application of the Piedmont Oil Co., a distributor, for a rehearing on the complaint the Commission dismissed. However, the Piedmont company, through the same attorneys, will file new complaints about other shipments so as not to lose its right to claim refunds. In addition refiners in the southwestern territory will also attack the rates.

While nominally the fight is against the whole rate, in each instance from Oklahoma and Texas to the southeastern point, the fight is really only against the parts of the through rates representing the charges of the railroads performing service east of the Mississippi. The complainants, to comply with the technical rules of practice of the regulating body, are compelled to direct their fight against all factors composing the rates from original point to destination, although thus far they have not shown any inclination to assert that the charges of the railroads west of Mississippi, on this traffic, are unreasonably high.

Prices to be Posted In Inch Letters

MADISON, WIS., Feb. 20.—General Order 23, issued last May by the Wisconsin Department of Markets, is about to be amended. G. O. 23 is the departmental order that makes it illegal to sell gasoline in this state at a secret price. It is the so-called "Posting Order". Complying with it, every oil jobber must post his prices publicly, as they relate to all grades of gasoline to all classes of trade.

The proposed amendment is to make the posting more effective. Quotations must be more conspicuous, in figures not less than one inch in height. Several jobbers in the recent investigation of Standard Oil Company's quantity discount agreements, took occasion to say the department's posting order had not had much affect on conditions in Wisconsin because the postings were not conspicuous enough.

The idea of the posting was to make secret prices illegal. No open price (or set of prices) was made illegal, no matter how high or how low or how irregular they might be. Only secret prices were illegal. The theory of the department was that the gasoline price structure in any community would be about right if the few dealers who are disposed to give secret rebates were made to come out in the open with their prices, before all their competitors and customers.

45 Attend Pennzoil Annual Dinner

BUFFALO, N. Y.—About 45 members of the sales staff of The Pennzoil Co., Inc., attended the recent annual conference and dinner of the New York and New England division of the company at the Buffalo Athletic Club here.

Sales policies and plans for the coming year were discussed by A. S. Matthews, vice president and general manager, H. L. Huson, advertising manager, and Mr. Lilleblade of the Sweeney James Advertising Agency. Other matters were discussed by other company executives.

A program of music and songs was presented.

N. Dakota Oil Marketers Re-Elect Officials

FARGO, Feb. 20.—The North Dakota Petroleum Association held its second annual convention in the Waldorf Hotel, Fargo, on Feb. 5, with about 25 jobbers present. H. M. Wilson of the International Oil Co., Minot, was re-elected president. H. A. Schmidt succeeded himself as vice president and treasurer. Other directors chosen were L. A. Abrogast, Jr., of Jamestown, T. L. Berry of Fargo and K. H. Helgerund of Harvey.

Paul E. Hadlick, secretary of the Minnesota Petroleum Association, consented to act as secretary of the North Dakota organization for 1926 to help put the association on its feet financially and build up a strong membership. He will handle the work from his Minneapolis office by mail and be aided by the officials and other enthusiastic members in the state. Several district meetings are being planned for some time in May to be held in such towns as Fargo, Grand Forks, Minot and Mandan.

The 25 members present adjourned their one-day session here with the expressed intention of making the North Dakota state association an effective influence capable of dealing with local problems as they arise, of building up the association to a membership that will fairly represent the industry in the state.

Mr. Wilson presided over the meeting. Following his report in the forenoon the meeting was thrown open to general discussion. The jobbers were advised that under the North Dakota tax law they undoubtedly had refunds coming for tax paid on gasoline used in their own trucks and on shrinkage. The secretary was directed to prepare and mail out a bulletin on this subject. It was also agreed that an effort would be made to have the gasoline tax law amended so that the money might be spent on roads rather than turned into the state's general fund.

The first speaker of the afternoon was N. E. Williams of the Security Traffic Bureau, Fargo, who explained the rate case which his company has before the Interstate Commerce Commission to get a reduction in freight rates on oil and refined products from Group 3. This activity of the association alone, it is said, will save the members thousands of dollars on future freight shipments, in addition perhaps to securing for them refunds on freight paid in the past.

Following Mr. Wilson, Mr. Hadlick talked on "Organization." James Malloy of the Greater North Dakota Association then talked on "Good Roads." The 1927 annual convention is planned to be held in Fargo for two days, but no dates will be named for several months.

ASHLAND, KY.—Rodgers Bros., coal operators here, have purchased 51 per cent of the stock of Sumit Oil & Gas Co., and have begun active operations five miles out of Ashland.

Builds New Refinery in Los Angeles

A. A. G. Scherbel, who for many years was manager of the old Muskogee Refining Co., Muskogee, Okla., is in Los Angeles and building another refinery. Associated with him is Richard Florian. Both men started in the oil business in the refinery office of the old Standard Oil Co. at Chicago. They came together again after many years, at Los Angeles.

Mr. Florian is president and Mr. Scherbel, secretary and treasurer. Their new refinery is known as the Western Oil & Refining Co. The plant is being erected at Wilmington, Calif., which is down on Los Angeles harbor. It is next to the refinery of the Union Oil Co. The plant will run 5000 barrels a day and occupy 100 acres. The company will also do a marketing business and have one service station constructed and in operation on the road in front of their plant site.

Both Mr. Florian and Mr. Scherbel were transferred from the old Standard Oil plant, Chicago, to Parkersburg. From there Mr. Florian went to Roumania where he had charge for a number of years of the Standard of N. J. plant.

Pure Oil Enlarging Plants

COLUMBUS, O.—Included in the refinery construction work of the Pure Oil Co. is the Marcus Hook, Pa. refinery, which is nearing completion. Work began on it last summer and it will be in operation again about March 1. About $2,000,000 has been expended in enlarging this plant to 10,000 barrels capacity, according to Charles A. Ward, editor of "Pure Oil News", official house organ of the company.

The company's Muskogee refinery is being enlarged from 2000 to 5000 barrels capacity. A large lube still, two cracking units, a Sharpless centrifugal system, and other additions are being made. New continuous stills are also being added to the Cabin Creek, W. Va. refinery.

A natural gasoline plant is being erected at Mehan, Okla., where the company has gas production. It will be known as gasoline plant No. 14 and will have a daily output of about 10,000 gallons.

Lion Oil Insures Employes

EL DORADO, ARK.—The Lion Oil Refining Co., with general offices here, has present insurance totaling $200,000 to 400 of its employes. Premiums will be paid in full by the employer.

Each employe with six months' service will receive insurance of $500. This amount will be increased every half year until a maximum of $2,000 is reached.

Youngstown
"KEENE TANKS MADE"
STANDARDIZED
REG. U.S. PAT. OFF.

A TRUCK TANK FOR EVERY PURPOSE

Youngstown Truck Tanks are built in a modern daylight factory, devoted exclusively to their production. Because of a strict system of standardization and ample capacity, we are able to make prompt deliveries. Prices compare favorably with other standard equipment.

Built in a range of sizes from 300 gals. to 2000 gals., for use on Fords to heavy duty trucks, in any number of compartments, eliptical or semi-rectangular types, embodying refinements which are the last word in truck tank construction from standpoints of material, workmanship, design and finish the Youngstown line stands alone.

Write and give us the following information and we will submit prices and name a delivery date: what make and model of chassis are you considering — — what is its load tonnage — — what capacity tank do you require — — number of compartments — — what safety features and accessories — — what kind of paint job do you want?

Our free illustrated folder with complete specifications will be mailed on request.

The Youngstown Boiler & Tank Company

Truck Tank Division

Youngstown, Ohio

Can You Always Put Your Hand On a Good Reference Book?

You can, if you own a set of the AMERICAN PETROLEUM INDUSTRY by Bacon and Hamor.

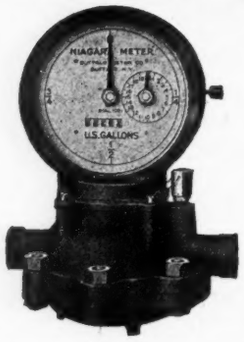
But if you are trying to get along without it, you are doing without two volumes of information carefully planned and arranged in such a way as to make them valuable reference books, of interest to the engineer in practice as well as to the research worker and student. Both volumes are illustrated throughout and cover the chemistry, geology, technology, history and economics of the subject thoroly.

The set sells for $12. Send us your order and make your check payable to—

National Petroleum News

834 Caxton Building **Cleveland, Ohio**

NIAGARA GASOLINE METERS



have proved their superiority to many service station owners. They meet every requirement of accuracy, speed, dependability and low cost. Let us show you how you can use them to advantage. Our catalog gives all the details.

BUFFALO METER CO.

2889 Main St. Buffalo, N. Y.

GULF Refining Company

General Sales Offices
PITTSBURGH, PA.
District Sales Offices
New York, Houston, Atlanta, Boston, New Orleans, Tampa, Philadelphia

REFINERS OF OKLAHOMA TEXAS AND LOUISIANA

PETROLEUM

REFINED OIL
GASOLINE
NAPHTHA
GAS OILS
PARAFFINE WAX
ASPHALT

Fuel Oil--Lubricating Oils

CYLINDER ENGINE
CORDAGE

RED AND PALE PARAFFINE OILS

New Oil Station Construction

LaGrange, Ga.—The Fincher-Traylor Oil Co., distributor of Purol gasoline and Tioline oils, is erecting service station here, making fourth station operated by the company here. The station will be triangular, facing on three streets. Storage will be underground and modern equipment will be used, according to J. E. Traylor, treasursr.

* * *

Bridgeport, O.—Valley Home Service Station Co., building service station. Another one will be started in March at Martins Ferry, O. Both stations will be equipped with Farr hydraulic systems with five outlets each, according to I. E. Hunt, president.

* * *

Melbourne, Fla.—Melbourne Service Co. erecting bulk plant at Titusville, Fla., which will be in charge of L. J. Ptacek, formerly of Jacksonville. A 15,000 gallon three-compartment storage tank for lube oils is being installed at the Melbourne plant.

* * *

Cala-Vista, Fla.—Blowers & Fraser completing filling station and garage here which will be leased to De Camp & Ellis. Texaco products will be handled exclusively.

* * *

Columbia, S. C.—Evans Motor Co., Inc., with general offices here, is building one filling station here and another one at New Brookland, a suburb of Columbia.

* * *

Miami, Fla.——Shaw Bros. erecting seven service stations here and are financing nine others for their clients who will distribute Sunoco products for them.

* * *

Chicago.—John A. Anderson, wholesale oil distributor at 612 No. Michigan Ave., will build bulk stations at Elgin, Aurora, Joliet and Rockford, Ill.

* * *

Norton, Kan.—George W. Taylor and son, Merlin A. Taylor recently completed a bulk plant and are building a brick service station at Colby, Kan.

* * *

Muncie, Ind.—Williams Oil Co. is building service station and installing bulk storage for lubricating oils at Anderson, Ind.

* * *

Crane, Mo.—Stone County Oil Co. is building bulk station at Reeds Springs, Mo., to be open about March 15.

* * *

Wellington, Kan.—White Eagle Oil & Refining Co., Kansas City, Mo., is building service station here.

* * *

Winchester, Kan.—Standard Oil Co. of Indiana, Chicago, building service station here.

Oil Patents Issued Recently

Production

Pulling Device.—George S. Bashline, Wynona, Okla. Filed Feb. 3, 1925. No. 1,570,607.

Earth-Boring Sampler.—Jacob Steigh, and Earl F. Choate, Taft, Cal. Filed Aug. 11, 1923. No. 1,570,647.

Screen for Oil Wells.—Charles H. Benckenstein, Vinton, La. Filed Nov. 3, 1924. No. 1,570,725.

Well Tool.—George B. Louderback, Compton, Cal. Filed June 24, 1924. No. 1,570,754.

Drilling-Line Support.—Morton Homer Magie, Los Angeles. Filed Nov. 14, 1921. No. 1,570,757.

Gauge for Oil Tanks.—Henry Rodin Smith, Prince Rupert, British Columbia, Canada. Filed Sept. 20, 1923. No. 1,570,790.

Latch Guard for Casing-Handling Tools.—Elihu C. Wilson, Los Angeles, Cal. Filed Nov. 1, 1923. No. 1,570,812.

Safety Device for Elevators.—Peter Wilson, Springfield, Ill. Filed Aug. 20, 1923. No. 1,570,813.

Apparatus for Drilling Oil Wells.—James P. Fisher, Bartlesville, Okla., assignor to Doherty Research Co., N. Y. Filed June 30, 1922. No. 1,570,828.

Fishing Tool for Wells.—John T. Helbert, Broadway, Va. Filed Aug. 17, 1923. No. 1,570,833.

Refining

Treating Hydrocarbon Oils.—Frank W. Hall, Port Arthur, Tex., assignor to The Texas Co., N. Y. Filed Sept. 20, 1921. No. 1,570,890.

Process of Treating Filtration Residues for Reuse.—Percy A. Boeck, Los Angeles, assignor, by mesne assignments, to The Celite Co. Filed Jan. 19, 1921. No. 1,571,042.

Miscellaneous

Liquid Storage and Supply System.—George W. MacKenzie, Beaver, Pa., assignor to Guarantee Liquid Measure Co., Rochester, Pa. Filed Dec. 17, 1920. No. 1,569,769.

Synthetic Manufacture of Methanol.—Alwin Mittasch, Ludwigshafen-on-the-Rhine, and Mathias Pier, Heidelberg, Germany, assignors to Badische-Anilin & Soda-Fabrik, Ludwigshafen-on-the-Rhine, Germany. Filed Sept. 4, 1924. No. 1,569,775.

"In the process of manufacturing methanol by the interaction of carbon monoxid and hydrogen in the presence of a catalyst capable of causing the formation of methanol by the said interaction, the step of completely excluding iron from the reaction."

Oil Rectifier.—William G. Wall, Indianapolis, assignor to Rectifier Manufacturing Co., Indianapolis. Filed Feb. 14, 1925. No. 1,569,795.

Method of Dehydrating Liquids.—Arthur S. Elsenbast, N. Y., assignor, by mesne assignments, to The Celite Co. Filed Mar. 14, 1922. No. 1,570,626.

Valve for Tank Cars and the Like.—Sven Johan Nordstrom, San Francisco, assignor to Merco Nordstrom Valve Co., San Francisco. Filed Aug. 28, 1922. No. 1,570,637.

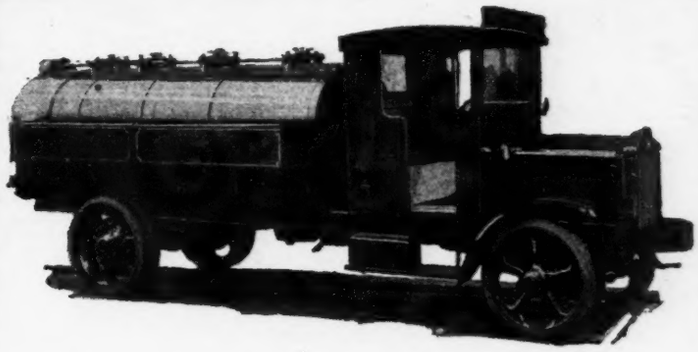
Process for Resolving Emulsions.—Eugene E. Ayres, Jr., Chester, Pa., assignor to The Sharples Specialty Co., Philadelphia, Pa. Filed Apr. 2, 1921. No. 1,570,987.

Recovered Inorganic Filter Aid and Process of Producing the Same.—Harry S. Thatcher, Los Angeles, assignor to The Celite Co. Filed Jan. 24, 1923. No. 1,571,074.

Tank-Car Valve.—Frank Whitney and Pete S. Coll, Glenrock, Wyo. Filed Apr. 11, 1925. No. 1,571,078.

Brace for Drill-Rod Wrenches.—John V. Yount, Shidler, Okla. Filed Mar. 9, 1925. No. 1,571,081.

Escape for Derricks.—Louis Garland Rambin and William Alfred Rambin, Smackover, Ark., William A. Rambin, assignor of one-half of his right to Louis Garland Rambin. Filed Sept. 30, 1925. No. 1,571,096.



New Equipment Buying Time Is Here

This is the time of year when oil marketers consider the purchase of new equipment to cope with the coming season. The keen competition which now exists makes it necessary to be up and doing every minute. Only proven methods and equipment of highest efficiency are to be relied upon. This is the reason hundreds of progressive marketers will again voice their approval of Weldco Truck Tanks by placing their orders early in the year. You may select your Weldco now and have it delivered whenever you want.

Drains Dry To The Last Drop

Weldco Truck Tanks drain dry to the last drop because of the exclusive funnel drain. Each compartment has an individual outlet shaped like a funnel. It is impossible for pockets of oil or gasoline to form in pools in the corners, thus causing short measure. It is never necessary to juggle the wheels on blocks.

Write today for our book of truck tank facts, "What to Consider When Buying A Truck Tank". Sent free to oil marketers.

The Youngstown Welding Co.

Welders Since 1912

Youngstown, Ohio

DRAINS LIKE A FUNNEL

WELDCO TRUCK TANKS

TRADE MARK REG. U.S. PAT. OFF.

American Operating Methods

are explained in a concise, practical way in OIL FIELD PRACTICE, by Dorsey Hager, petroleum geologist and engineer.

It is written for the business man, the oil field driller and operator, the geologist and the investor.

You may obtain this book containing 310 pages and 98 illustrations by mailing check for $3 to—

National Petroleum News

820 Caxton Building **Cleveland, Ohio**

HERE & THERE

National Petroleum News

P. L. Lattner and P. A. Haven have succeeded H. F. Tuttle as managers of the Kansas City, Mo. division of the Independent Lubricating Co., Topeka, Kans. Mr. Tuttle is opening up new territory which is directly under the jurisdiction of the main office at Topeka. The company increased its business 125 per cent in 1925 over 1924 and has good prospects for the current year, according to E. W. Fawcett, manager at Topeka.

* * *

Sheldon Clark, vice-president, Sinclair Refining Co., has been appointed chairman of the athletic committee of the Chicago Athletic Association and has been elected a director of the Lake Shore Trust & Savings bank, Chicago. Mr. Clark is widely known as a yachtsman but is interested in other amateur athletics as well.

* * *

William F. Lusch, of Lusch & Holbrook, Pittsburgh, Pa., is visiting New Orleans, accompanied by Mrs. Lusch. They are stopping at this point on their way east from the recent A. P. I. convention at Los Angeles, and expect to remain in New Orleans for the Mardi Gras ball.

* * *

T. B. Williams, formerly with the Evans Motor Co., Inc., Columbia, S. C., is now with the Mutual Casualty Co., according to James M. Evans, secretary and treasurer of the former company. L. H. Childs succeeds Mr. Williams.

* * *

Alton Box, who has been with the Gulf Production Co. at Breckenridge, Tex. for some time, has been transferred to the Gulf Venezuela Oil Corp. at Maracaibo, S. A., as clerk in the warehouse department.

* * *

H. Stuart Tegner of the research department, Anglo-American Oil Co., Ltd., London, is in the States visiting several of the refineries of the different Standard Oil Cos.

* * *

S.H. Lashley, secretary, treasurer and general manager of the Commodore Oil & Gas Co., has sold his interest in the company and is spending the balance of the winter in St. Petersburg, Fla.

* * *

C. E. Smith, salesman in Georgia for Havoline oils of the Indian Refining, has been confined to a hospital on account of an operation.

* * *

H. S. Palmer, service station owner at Wooster, O., has taken the agency for the Sinclair Refining Co.'s bulk plant there.

Charles D. Jones, owner and manager of the business conducted under the name of J. Jones & Brother, Philadelphia, Pa., will have the distinction of possessing a business which will pass the century mark in 1929. When the business started, lubrication consisted of tallow, lard and sperm oils.

Mr. Jones is one of the original members of the Philadelphia Oil Trade Association.

* * *

W. A. Fowler, district manager at Knoxville, Tenn., for the Indian Refining Co., Lawrenceville, Ill., was in Atlanta, Ga., on Feb. 15, 16 and 17, attending the meeting of Independent oil men of Georgia, Florida and Alabama who were organizing an association.

* * *

Charles E. Horel, formerly tank wagon salesman at Coin, Ia. for the Marland Refining Co., Ponca City, Okla., has taken over the agency of Marland products at Guilford, Mo.

* * *

M. V. Stenseth, salesman at Abilene, Kans. for the Standard Oil Co. of Indiana, has been promoted to the gasoline department at the main offices in Wichita, Kan.

* * *

E. W. Sinclair, J. W. Carnes and J. J. Farrell of the Sinclair Refining Co., recently inspected the new Sinclair ocean terminal at Charleston, S. C.

* * *

Phil T. Williams, president of the Williams Oil Co., Muncie, Ind., has moved to Anderson, Ind., to open up an oil jobbing business.

The high man in gasoline and oil sales on the sales staff of the Tide Water Oil Corp., New York City, for two consecutive years, was Lyndon Pierce, who captured first place in 1924 and 1925 in the company's national sales contest.

The contests are based on seven items, four of which are gallonage, and three directional items which stress the importance of selling according to the company's policies.

J. B. Parent won second place in the 1925 national contest and was the leader in the central department. C. C. Forgee was third man in the National contest and leader of the eastern department; H. J. Selig was northeastern department leader; G. F. Herrman, western department leader and G. W. Davis, Jr., southeastern department leader.

Mr. Herrman was recently appointed sales supervisor of the north Pacific district, with headquarters at Seattle, Wash.

W. V. Tarver, general manager of the Seven-Eleven Tire & Accessory Co., Greenwood, Miss., attended the meeting of the Mississippi Independent Oil Jobbers Association at Jackson, Miss. on Feb. 5. After the meeting, Mr. Tarver and Dick Clark, Independent oil marketers at Tupelo, Miss., visited one of the large Independent oil stations in Biloxi. After this they returned to Greenwood where Mr. Clark visited the offices of the Seven-Eleven company.

* * *

S. B. Eckert, president of the Peninsular State Oil Co., Jacksonville, Fla., and P. H. Harrison, vice president, are on a semi-annual tour of inspection of bulk stations through the state, reports G. B. Allen, general manager of Melbourne Service Co., Melbourne, Fla.

* * *

L. R. Manning, formerly with the L. R. Manning Co., Decatur, Ill., has been appointed general manager of the Wabash Petroleum Products Co., of Wabash, Ind., according to Paul Elliott, manager of the Interstate Petroleum Products Co., Marion, Ind.

* * *

Mr. and Mrs. L. K. Pace were looking over Florida territory recently and visited River Junction, Fla. Mr. Pace is salesman for the Standard Oil Co. of Kentucky and he finds road conditions better and business picking up in Florida.

* * *

Mrs. H. G. Ridley, wife of Mr. Ridley, assistant salesmanager of Imperial Oil Marketing Co., El Dorado, Ark., is confined to a hospital at Dallas, Tex., for treatment. Mr. Ridley accompanied his wife to Dallas.

* * *

G. L. Gano, formerly with Kettle Creek Refining Co., El Dorado, Ark., is now with Imperial Oil Marketing Co., El Dorado, as special traveling representative in the territory handled by the El Dorado office.

* * *

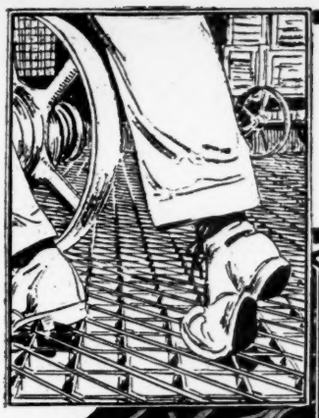
Martin L. Shaw, of Shaw Bros., Miami, Fla., distributors for Sun Oil Co. products at Miami, will leave on March 2 for the West Indies and South America.

* * *

David Browning, president of the Venus Oil Corp., Ashland, Ky., has just returned from Saginaw, Mich., where he went in interest of his company.

* * *

C. R. Jones, formerly salesman in Miami, Fla., for the Seaboard Oil Corp., Jacksonville, has been promoted to bulk station manager at Miami.



There's Permanent Safety and Economy, in IRVING PATENTED SUBWAY FLOORING

And there's the same inbuilt safety in Irving "Safsteps," the all-steel safety stair steps.

Its foot-gripping, non-slipping surface is not impaired by time or wear—or by oil, grease, water or ice. It is all steel, with the life and durability of steel. It's first cost is moderate—and you needn't figure on after-costs. You'll get more service at less cost per year, from **"Subway,"** than from any other flooring.

Ample stock of steel, unequaled factory facilities, and an ever-ready organization, enable us to make prompt deliveries in any quantity.

Ask us for Catalog 4A—58.

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y. U.S.A.

More Than A Truck Tank

It is Certified Oil Transportation and It Carries ALL the Oil

When you buy Good Trucks, equip them with Real Tanks. A Brown Certified Tank fills the bill. More Exact Fit, Long Life, No Repair Bill, Good Appearance

BROWN SHEET IRON & STEEL CO. **ST. PAUL, MINN.**

Tear out this page and mail it today

We are interested in your tanks. Send your catalog and prices.

Make of Truck..... Year..... We operate.....(number) Tank Trucks.

Other equipment on which you may send prices.....

Name..... Address.....

Refineries Decrease In Number During 1925

WASHINGTON, Feb. 20.—A survey of petroleum refineries, made by the Bureau of Mines, shows a total of 509 refineries in the United States on Jan. 1, 1926. Of these, 352 refineries, with capacity for treating 2,560,000 barrels daily, were being operated, while 157 refineries, with a total capacity of 290,000 barrels daily, were shut down. In addition, two refineries, of probable aggregate future capacity of 5000 barrels per day, were under construction.

A similar survey made by the Bureau of Mines as of Jan. 1, 1925, showed a total 541 completed petroleum refineries, with a total daily refining capacity of 2,827,000 barrels, and 6 refineries, with a total capacity of 37,000 barrels per day, under construction. On Jan. 1, 1921, there were 415 completed refineries, with a total capacity of 1,889,000 barrels, and 44 refineries, with a total capacity of 77,000 barrels, under construction.

Texas, with 100 refineries of 555,000 barrels capacity, leads in number of refineries, although outranked in total daily capacity by California, which has 84 completed refineries of 716,000 barrels capacity. New Mexico, with six refineries, and Montana, with 13, showed the largest proportionate increase in the number of refineries over that of a year ago. This was due mainly to developments during 1925 in the Artesia and Kevin-Sunburst fields.

Of the total number of completed plants, 289, of 830,000 barrels capacity, are skimming plants making gasoline, kerosene, and gas and fuel oils. The greater part of the remaining capacity is that of complete plants, the relative percentage of which is steadily increasing. Approximately 150 plants have cracking equipment, the total charging capacity of which is probably in excess of 900,000 barrels per day.

Comparison of this census with those made by the Bureau of Mines in previous years discloses the trend of the refining industry toward centralization and its adjustment to economic changes. The period 1919-1920 was one of high prices for refined products, gasoline reaching 30 cents, tank wagon price, in New York, or approximately 75 per cent over the price today. Then followed a period of great expansion of refinery capacity, so that on Jan. 1, 1920, 99 refineries were reported as building, compared with two on Jan. 1, 1926. The price reductions of 1921 and the increasing competition of following years caused the abandonment of many partly constructed plants and the cessation of operations in many completed ones. These now stand as rusting monuments to this period of optimism, and it is estimated that 40 of the them of approximate capacity of 60,000 barrels per day have been dismantled or junked during the past year.

The growth in number of small skimming plants is incompatible with the present keen competition in the refining industry, the Bureau points out. Such plants exist today by reason of local advantages or discoveries of flush production in fields remote from pipe lines. As such conditions are gradually disappearing, it is probable that the peak in the number of refineries in the United States has been passed.

The results of this census are given in "A Directory of Petroleum Refineries in the United States, Jan. 1, 1926," compiled by G. R. Hopkins, petroleum economist, copies of which may be obtained from the Bureau of Mines, Department of Commerce, Washington, D. C.

Jobbers Form Q. D. A. for State Patronage

KANSAS CITY, Feb. 20.—The first of a series of regional meetings planned by the Missouri Oil Men's Association to be held at different places in the state during 1926, convened in the Terry Hotel, Sedalia, on January 26. Nearly 50 jobbers were present. W. A. McAfee, state oil inspector, addressed the oil men on matters pertaining to his department and answered their questions.

B. H. Piepmeier, chief engineer of the Missouri highway department, outlined the road building program for 1926 and subsequent years. Among other things, the gasoline requirements of the state highway department were discussed.

At present the highway department of the state is buying gasoline from the Standard Oil Co. of Indiana on its quantity discount agreement, but George S. Allee, secretary of the Missouri jobbers, states that he believes plans may be worked out so that the Independents can get some of the business. In order to do this, the association members will have to work together and develop a plan of discount for Mr. Piepmeier equivalent to that of the Standard.

Adds Car Washing Machine

TUSCALOOSA, ALA.—The White Oil Co. is building a drive-in service station at Searles, Ala., equipped with two pumps. It is also installing a new automatic washing machine at each of its six service stations, which will use the air from its already equipped compressors. Washing of cars will be speeded up to about 15 minutes per car, according to S. H. Shepherd, manager.

The company also operates 38 curb pumps here, all of which dispense White Mule gasoline which is a U. S. Motor specification grade and 42-44 water white kerosene. The gravity system of unloading is used at the company's bulk terminal.

The bulk terminal is located at such elevation that all products flow from the railroad cars into the terminal and to the loading trucks by gravity.

Capitol Oil Has Annual Sales Meeting

PETERSBURG, VA., Feb. 20.—Agents and traveling representatives of the Capitol Oil Co., Inc., distributor of Texaco petroleum products, with headquarters here, attended the first annual meeting at the Petersburg Hotel here on Jan. 30.

An address of welcome was delivered by Dan S. Hollenga, of the Petersburg Chamber of Commerce. D. H. Jackson, president of the company, then addressed the meeting, outlining plans for the current year. W. J. Barton, vice president and general manager of the company, was next on the program, and he spoke on sales and advertising plans of the company, which was followed by a general discussion.

H. E. Jackson, vice president and superintendent of equipment, chose as his subject the care and operation of station equipment. B. P. Beall, vice president, talked on the operation of filling and distributing stations and G. R. Barksdale, secretary and treasurer, followed with a talk along similar lines. C. Lee Wolff, auditor, spoke on accounting and collections.

The Capitol company was organized four years ago when the present company took over the holdings of the Virginia Oil & Supply Co., of which D. H. Jackson was head. It now has the exclusive distribution of products of The Texas Co., Houston and New York, in its section of the state. Distributing stations are maintained at Petersburg, Culpeper, Hopewell, Fork Union, Blackstone, Warrenton, Wakefield, Boydton, Milford and Mineral, Va., and at White Sulphur Springs, W. Va.

State Executives Club Meets in Chicago

CHICAGO, Feb. 20.—The State Executives Club, an organization of men who are officers in state oil associations throughout the country, has planned another meeting in Chicago at the Congress Hotel, April 6, 7 and 8, coincident with the spring convention of the National Petroleum Marketers Association. The State Executives Club took permanent form at the meeting last fall of the N. P. M. A. in Louisville, Ky.

Paul E. Hadlick, secretary of the Minnesota Petroleum Association, is secretary of the club and he is issuing an invitation to presidents and secretaries of all state associations to be present. James A. Gilmore, secretary of the Michigan Independent Oil Men's Association, is president of the State Executives Club. This unique clearing house of information has been in existence, with only a temporary organization at each meeting, for three years.

Pet. Safety Council To Meet In Houston

TULSA, Feb. 20.—The annual meeting of the Petroleum Safety Council will be held at Houston in the latter part of March it was decided at a recent meeting of the board of directors. Exact dates are to be announced later by Ray Miller, director. The program for the meeting is being worked out under the direction of H. W. Boggess, Sinclair Oil & Gas Co.

The board of directors of the council voted to reduce membership fees for the coming year to 50 cents per employe of member companies. Last year the dues were 60 cents per employe. The cut in dues will not decrease the activities of the council. A new work of the council will be a series of foremen's meetings to be begun in Kansas and carry through Oklahoma, Texas, Arkansas and Louisiana.

At the present time the latest safety motion picture of the council "Your Job—Are You Its Master or Slave," is being shown in Texas, following a showing in Louisiana and Arkansas. Showings from Feb. 19 to March 15 will be: Feb. 19, Houston; Feb. 20, Goose Creek; Feb. 22, Baytown; Feb. 24, Luling; Feb. 25, Lockhart; Feb. 27, Mexia; Mar. 1, Wortham; Mar. 2, Corsicana; Mar. 3, Mildred; Mar. 5, Ranger; Mar. 6, Eastland; Mar. 8, Breckenridge; Mar. 9, Eliasville; Mar. 10, Wichita Falls; Mar. 11, Vernon; Mar. 12, Burkburnett; Mar. 13, Holliday; and Mar. 15, Electra.

Oil Company Uses Telephotographs

NEW YORK.—Telephotographs, which are pictures sent over long distance telephone wires, have been used and found valuable as time-savers by many industrial concerns since they were first introduced to the business world two years ago at the Republican national convention, according to the American Telephone & Telegraph Co., with headquarters here.

One of the large oil companies in New York, with offices on the Pacific coast, has found the telephotograph important in its accounting department. Each month the Pacific coast offices of this company mail their balance sheet to the San Francisco office where they are combined, and a trial balance sheet is sent to the main office of the company in New York. This trial balance sheet is now sent by telephotograph, hastening its arrival in New York by at least three days, which enables the company to issue its monthly financial statements several days earlier than formerly.

ELECTRA, TEX.—T. T. Taylor, chief chemist of the Waggoner Refining Co. here, is looking forward to a big year because of the cracking plant of one unit and the natural gasoline plant which will be installed.

"DEFIANCE"

KEEP YOUR PROFITS

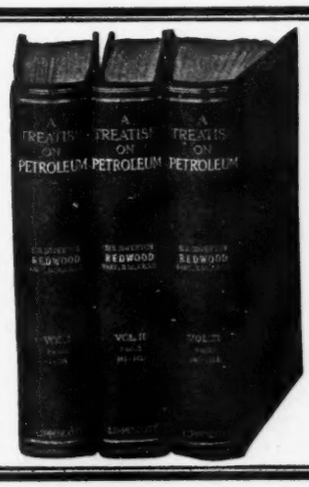
You make a quotation and sell your merchandise. The difference between the selling price and what it costs you to produce, sell and ship, represents your profit.

A damage package, an unexpected shipping expense, means a loss.

Defiance Steel Barrels reduce shipping losses.

THE AMERICAN STEEL PACKAGE CO.

Defiance, Ohio



Information on all branches of the petroleum industry is to be found in the 4th edition of A TREATISE ON PETROLEUM by Sir Boverton Redwood.

To obtain this valuable set make your check for $39 payable to

NATIONAL PETROLEUM NEWS
811 Caxton Bldg. Cleveland, Ohio

California Production on More Stable Basis Than in Recent Years

By Paul Wagner
N. P. N. Staff Writer

LOS ANGELES, Feb. 19

SOUTHERN California production is now on a more consistent basis than it has been since the Los Angeles Basin fields upset the petroleum industry in 1923 and forced a remapping of its economic structure.

Few new fields in this region may be expected to exert flush influence on the Pacific Coast producing province in 1926, but it is not apparent on the other hand that there will be radical declines below present averages of about 620,000 barrels daily for the whole of California.

California's 60,000 barrels daily of shut-in possible production is all in the San Joaquin Valley district or the so-called Coastal fields north of Santa Barbara. These fields began the present year with roundly 168,550 barrels daily production. It is within the realm of possibility, therefore, to increase their yields to approximately 230,000 barrels daily, but the continued accumulation to storage of heavy fuel crudes makes it improbable that shut-in possible production will be opened up for the present.

Included under the total of roundly 450,000 barrels daily production accredited to Southern California there is a combined yield currently of roughly 170,000 barrels daily from two areas where development is still in the ascendancy. These are in the Ventura-Newhall and Long Beach areas.

Los Cerritos Development

Long Beach production is again in the ascendancy because of the Los Cerritos development, northwest of the Signal Hill part of the field, where the structural condition may be likened to the "heel of a boot" and where a frenzied drilling campaign for 300 to 700 barrel wells is being carried on.

It is improbable that Los Cerritos development will bring Long Beach production to a higher level than 145,000 barrels daily, a peak likely to be reached the latter part of March unless unmeasured factors appear to upset present calculations. Los Cerritos is producing from about 100 feet of pay horizon as compared with many times that thickness of sand in the Signal Hill part of the field.

The fact that a deeper pay is considered to exist in the Los Cerritos area has been given scant attention in estimates for the future of its production. Therefore, statements of the present may be well tempered with caution because of the possibility of a deeper zone materially adding to daily average yields eventually. Present production comes from approximately the 4300-foot level and the deeper zone occurs below 4700 feet.

Ventura-Newhall production was increased in 1925 from a stable level above 11,600 barrels daily to an average January 1, last, of 36,743 barrels, which may be somewhat increased the present year. Virtually all of the increase came from the Ventura Avenue field, where a deeper horizon than that previously exploited is now being developed by the Shell Co. of California, the General Petroleum Corp., and the Associated Oil Co.

The character of operating control may be assumed to work against Ventura Avenue production getting out of bounds, but enough work will proceed to keep this field near, or above, present levels in 1926. Indeed, the field could be developed under conditions to give it major economic proportions were the crude oil requirements of operating companies such as to make such activities desirable.

Ventura-Newhall production, which combines the yields of all fields in Ventura county, classifies under Southern California without its forming a part of the Los Angeles Basin sub-division of the Pacific Coast general province.

The Los Angeles Basin, insofar as increased daily averages can be measured at this time, will be effectively mainly at Long Beach and in a small way at Huntington Beach. The last mentioned field probably will show only a few thousand barrels daily in its gains, which will come from slowly drilling up acreage in parts of the field unaffected by the development boom of 1923.

A measure of other fields in the Los Angeles Basin is more difficult because of the intangible factors necessary to be taken into account in some of the areas where production could be increased were it found desirable to develop strongly held properties.

Dominguez, Inglewood and Rosecrans are fields to be considered in this connection. A deeper pay than that which is now under exploitation exists in the Dominguez field and a similar condition is assumed for the Baldwin Hills, in which the Inglewood development is located.

Three companies control all except "edge" properties at Dominguez and they hold its future in their hands. These companies are the Shell, the Burnham Exploration and the Union. The properties owned by the two last mentioned companies are operated by the Union, so that in an operating sense only it and the Shell figure in development work away from the field edges where the General, Shell and Marland have small leases.

Inglewood is fairly well developed in the first producing zone, which does not extend below 2800 feet. Future operations will be pursued with less intensity in drilling for the deeper zone, which probably will be found to be richest in parts of the Baldwin Hills where the acreage control is tighter than it is in the developed area.

Investigation indicates to the writer that Inglewood-Baldwin Hills production will decline only slightly this year, if at all, because of fresh development work to be carried ahead slowly but consistently.

Central Uplift Defined

All the fields hereinbefore mentioned, except those of Ventura-Newhall classification, are located on the so-called Central Uplift of the Los Angeles Basin. Others located on this uplift, which is now recognized to be marked by a fault extending southeasterly from Inglewood to Newport, are the indicated Seal Beach and Newport developments, plus prospects at Hyde Park and Sunset Beach.

Hyde Park is located between Inglewood and Rosecrans. It has not progressed beyond the wildcatting stage, but would come in for important consideration should the Marland Oil Co. of California complete its recently started test as a producing well. Deep wildcatting is slow work in the Los Angeles Basin, however, and a producing well at Hyde Park would necessarily come too late

Table 1—Comparative Daily Average Production In Southern California Fields (A.P.I. Figures)

SOUTHERN CALIFORNIA FIELDS	Daily Avg., 1-1-1925, in bbls.	Daily Avg., Year 1924, in bbls.	Daily Avg., 1-1-1926, in bbls.	Daily Avg., Year 1925, in bbls.
Long Beach	125,600	164,268	108,986	110,064
Santa Fe Springs	50,641	72,130	49,950	51,971
Huntington Beach	41,966	47,906	46,342	42,527
Dominguez	52,937	18,611	24,951	36,715
Rosecrans	7,638	1,671	24,582	19,900
Inglewood	101	29	62,904	50,207
Torrance	44,942	47,886	31,515	36,280
Los Angeles-Salt Lake	2,122	2,479	1,914	2,005
Whittier	1,957	2,080	2,008	2,035
Fullerton	11,511	11,259	13,958	12,278
Coyote Hills	20,306	15,529	17,033	19,562
Montebello	17,485	17,023	18,102	18,748
Richfield	11,512	12,179	13,357	11,831
Newport	.....	.....	73	119
Ventura-Newhall	11,637	10,984	36,743	25,379

American Tri-Lube

THE ONLY LUBE combining these 4 essentials

Why get a lube that hasn't *every* essential for perfect serving of oil?

For instance—a leaky nozzle with a drip pan—the drippings catch dust and dirt and carry them into the tank, damaging every drop of oil it contains.

You can't give good service with such a lube.

The American Tri-Lube is the *only* lube combining all essentails for *perfect* service.

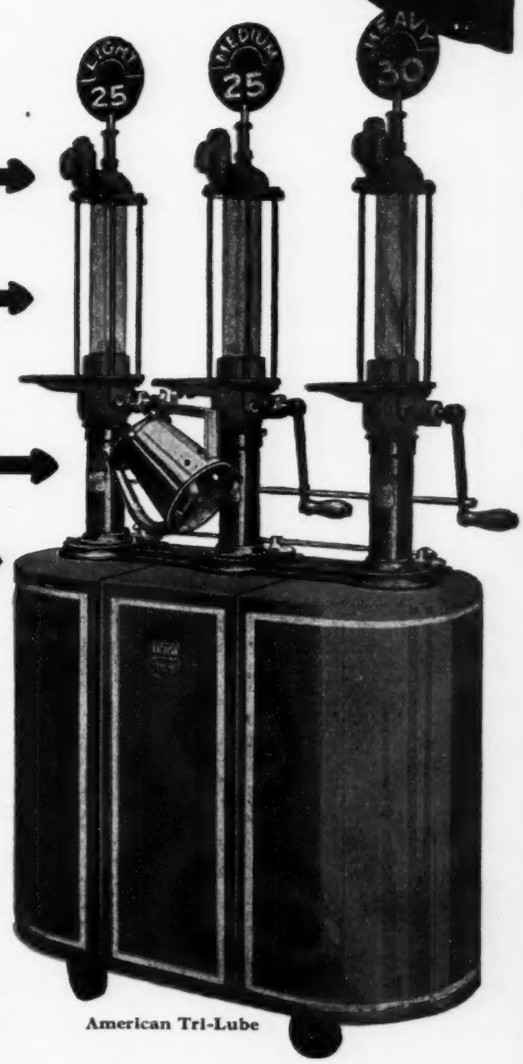
It costs a few dollars more, but its worth it. Note the following:

1 **Absolutely non-drip nozzle—not one drop in 24 hours. There are other *so-called* non-drip nozzles that *drip*—unlike the American.**

2 **Thin, 3-inch glass cylinders give greatest visibility and easy operation. Show oils in clean and attractive manner. Pump measures absolutely accurate quantity.**

3 **No drip pan and return line into pump carrying dust and dirt—all working parts are in neck protected from corrosion and dust.**

4 **Tank always clean and attractive, and absolutely water-proof. Outside of tank offers splendid opportunity for advertising brands of oil.**



American Tri-Lube

The American Oil Pump & Tank Co.

1713 Dalton Street CINCINNATI, OHIO

Refinery Products Directory

GASOLINE AND NAPHTHA

OKLAHOMA

56-58 450 E. P. Gasoline
★Bolene Refg. Co., Enid, Okla.
58-60 450 E. P. Gasoline
★Bolene Refining Co., Enid, Okla.
58-60 U. S. Motor Gasoline
★Bolene Refg. Co., Enid, Okla.
60-62 400 E. P. Gasoline
Altitude Petroleum Co., Tulsa, Okla.
64-66 390 E. P. Gasoline
★Bolene Refining Co., Enid, Okla.
68-70 350 E. P. Gasoline
Altitude Petroleum Co., Tulsa, Okla.

PENNSYLVANIA

50-52 Naphtha
Emery Mfg. Co., Bradford, Pa.
54-56 Naphtha
Emery Mfg. Co., Bradford, Pa.
58-60 Straight-run Gasoline
Emery Mfg. Co., Bradford, Pa.
60-62 Straight-run Gasoline
Emery Mfg. Co., Bradford, Pa.
62-64 Straight-run Gasoline
Emery Mfg. Co., Bradford, Pa.
64-66 Straight-run Gasoline
Emery Mfg. Co., Bradford, Pa.
68-70 Straight-run Gasoline 305-320 E. P.
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.
70-72 Straight-run Gasoline 300-305 E. P.
Emery Mfg. Co., Bradford, Pa.

NATURAL GASOLINE

OKLAHOMA

Grade A
Altitude Petroleum Co., Tulsa, Okla.

BURNING OILS

OKLAHOMA

42-44 Water White Kerosene
Altitude Petroleum Co., Tulsa, Okla.

PENNSYLVANIA

45 Water White Kerosene
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.
46 Water White Kerosene
Emery Mfg. Co., Bradford, Pa.

NEUTRAL OILS

PENNSYLVANIA

150 Vis. No. 3 Asso. Filt.
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.
180 Vis. No. 3 Asso. Filt.
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.
200 Vis. No. 3 Asso. Filt.
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.
34 Gravity 350-360 Flash
Pennsylvania Oil Products Refg. Co., Warren, Pa.

CYLINDER OILS

PENNSYLVANIA

600 Steam Refined
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.
635 Steam Refined
Emery Mfg. Co., Bradford, Pa.
650 Steam Refined
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.
600 Flash Steam Refined
Emery Mfg. Co., Bradford, Pa.
600 Warren E
Pennsylvania Oil Products Refg. Co., Warren, Pa.
600 Oil City E
Pennsylvania Oil Products Refg. Co., Warren, Pa.
Cold Test Stock (bright filtered)
Pennsylvania Oil Products Refg. Co., Warren, Pa
Cold Test Stock (dark filtered)
Pennsylvania Oil Products Refg. Co., Warren, Pa.
Black Oil
Emery Mfg. Co., Bradford, Pa.

MOTOR OILS

PENNSYLVANIA—100% PURE
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.

WAX

PENNSYLVANIA

122-124 White Crude Scale
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa.

FUEL OILS

OKLAHOMA

24-26 Zero Fuel Oil
Altitude Petroleum Co., Tulsa, Okla.

PENNSYLVANIA

36-40 Fuel Oil
Emery Mfg. Co., Bradford, Pa.
Pennsylvania Oil Products Refg. Co., Warren, Pa

in the year, if at all, to permit a new field assuming proportions of economic effect before next fall or winter.

Structural conditions at Rosecrans are complex enough that the field may be considered currently as yielding about as much as it will do in terms of daily averages.

The stresses that produced the Inglewood-Newport fault, with its consequent "highs" and "lows" along the fracture, brought about differing detailed conditions from one "high" to another. Until more is known of the detailed, or local, conditions at Rosecrans it may not be expected to assume comparative producing rank with such fields as Inglewood, Long Beach or Huntington Beach.

Signal Hill Fault Focus

As explained on page 49 of the December 23, 1925 issue of National Petroleum News, the Signal Hill structure in the Long Beach field represents the focal point of the stresses producing the Inglewood-Newport fault. Northwesterly from Signal Hill toward Inglewood the structures are progressively lower in a general sense than they are at the focal point. They are successively lower also in a southeasterly direction from Signal Hill past Seal Beach, Sunset Beach, Huntington Beach and Newport, near which last mentioned area the Central Uplift swings under the waters of the Pacific Ocean.

A first commercially production well was recently completed by Marland at Seal Beach, where a yield of approximately 700 barrels daily was accredited to the 4800-foot discovery. Showings had been found in earlier tests of other operators, but none of them completed for commercial production.

The worth of Seal Beach as a producing field is yet to be established, but it is considered certain that some value attaches to the discovery. Marland, the Shell, Union and Associated companies control virtually all the acreage possible of production and it is assumed there will be no rush to develop the field beyond the ability of the industry to absorb the oil under favorable economic conditions.

Sunset Beach is purely a prospect between Seal Beach and Huntington Beach, and probably it would not gain much headway in 1926 even should it prove out favorably under test later in the year. Newport is productive only from one or two wells, which are more significant than they are currently important and which yield small quantities of heavy oil.

Elsewhere than the Central Uplift there is little to expect from the Los Angeles Basin in 1926 except the approximate maintenance of the production levels of old fields, unless and until new discoveries make themselves felt under conditions now impossible to measure.

The West Coyote field, in the Coyote Hills, has been proved for deeper zone production of importance by a flank well that permits a fair gauge of greatly increased final yields, running into millions of barrels. The field is controlled entirely by the Standard, however, and no effort is being made to recover oil from the deeper reserve zone for the present.

The power of old fields in Southern California to increase their daily averages is shown in the accompanying Table 1, where Fullerton, Montebello, Richfield and others are accredited with greater yields in 1925 than previously. In all these fields there are leaseholds solidly held by operating companies who can increase their production to a greater or lesser degree when company requirements call for further development.

It is not on the cards that fresh development campaigns will gain headway in old fields of the Basin, but it is pertinent to this discussion to mention that insofar as the larger operating companies are concerned they are in position to exploit such semi-reserve areas when their crude requirements make such steps necessary.

California Production

In the twelve months ended with March, 1925, the net decline of California daily average production approximated 5.9 per cent, against an increase in the succeeding nine months to January 1, 1926 of about 3.3 per cent. Production averaged 620,958 barrels as of the last mentioned date, based on the preceding 30 days.

The Dominguez and Torrance fields had their ascent to their peaks in the twelve months ended with March, 1925, whereas only Rosecrans, Inglewood and Ventura Avenue were factors working against decline forecasters in year ended prior to January 1, 1926.

Comparative production figures in the accompanying Table 1 give fair clues to the performance of all the fields in Southern California back through 1924, including whatever influence was exerted by pools enumerated in the foregoing paragraph after the time they became effective.

Some of the California forecasters have

Table 2—Field Recoveries, Proved Ground and Per Acre Yields In Southern California. (Mining Bureau and A.P.I. Figures Combined.)

SOUTHERN CALIFORNIA FIELDS	Accumulative Production to 1-1-1926	Proved Ground (Acres)	Per Acre Recovery to 1-1-26
Long Beach	189,202,000	1200	157,668
Santa Fe Springs	138,311,000	1572	87,984
Huntington Beach	81,096,000	2280	35,568
Dominguez	20,248,000	870	23,273
Rosecrans	7,875,000	370	21,283
Inglewood	18,359,000	530	34,639
Torrance	32,970,000	3550	9,287
Los Angeles-Salt Lake	60,014,000	2324	25,823
Whittier	11,585,000	635	18,244
Fullerton	109,500,000	3150	34,761
Coyote Hills	100,228,000	2720	37,216
Montebello	63,742,000	1180	54,018
Richfield	35,079,000	1295	27,088
Newport	34,130	....	....
Ventura-Newhall	48,842,000	4040	12,089

declined production in their "Look Ahead" sheets to as low as 565,000 barrels daily, January 1, 1927, and one of them provisionally mentioned a similar yield level for July 1, 1926.

The last mentioned forecaster frankly admits, however, that his estimate takes no account of material quantities of new production from fields now being exploited or fresh yields to come more clearly into the picture through development work of succeeding months.

Investigation by the writer confirms him in the opinion that Southern California production may be somewhat increased from present levels and that the whole of the state will average for the year 1926 considerably above 600,000 barrels daily. It is not improbable, in the writer's opinion, that the daily average over monthly periods for the entire year will equal or exceed the 600,000 barrels minimum he has set for 1926 as a whole.

It is pertinent in this connection to call attention to the various California estimates of the past, all of which were invariably low and few of which escaped the criticism that the wish for declines fathered the downward racing thoughts toward diminishing yield set-ups.

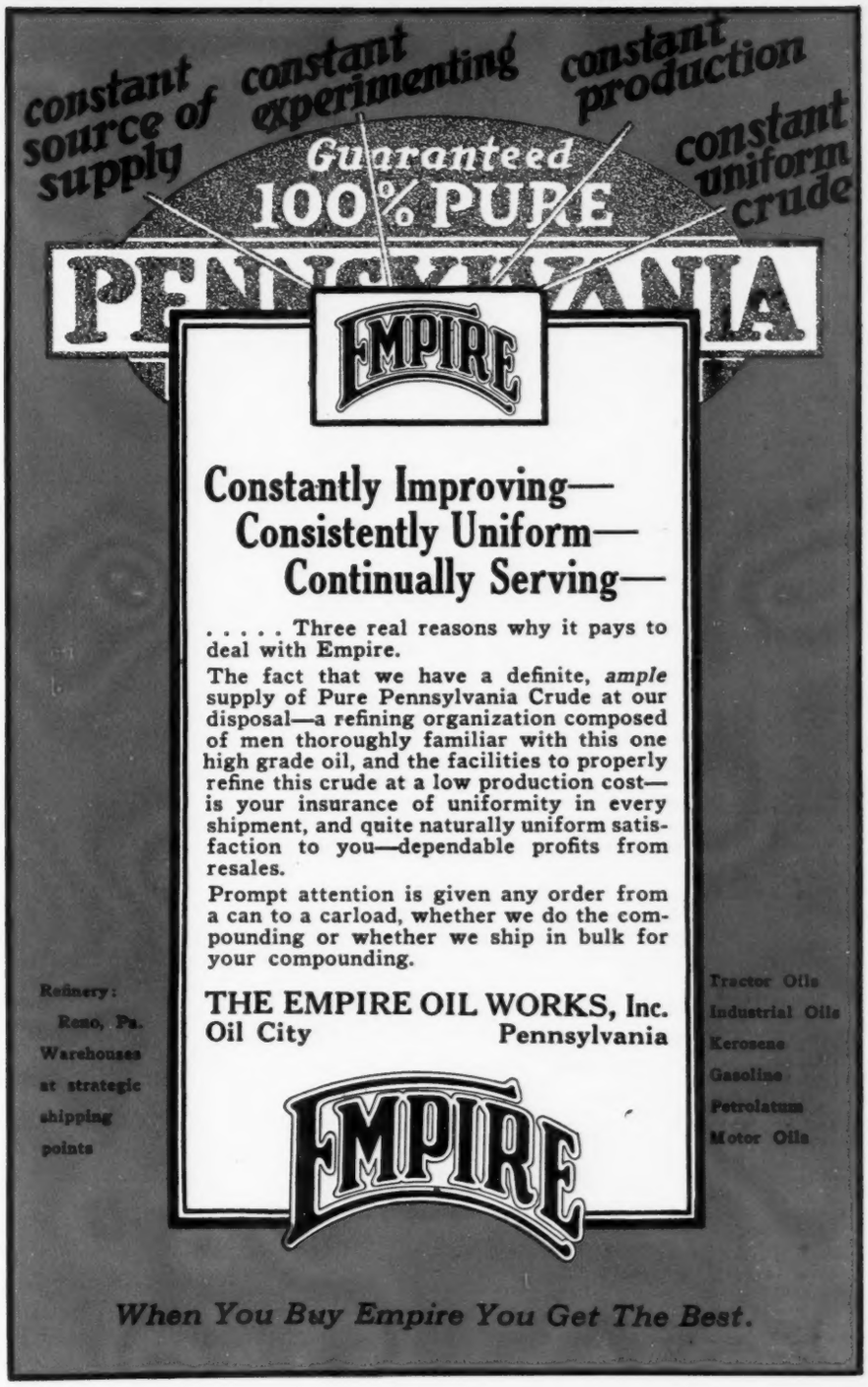
Factors overlooked in making up the estimates resulted in some of the forecasts missing their mark anywhere from 80,000 to 180,000 barrels daily. Even as late as 1925, many forecasts were from 60,000 to 75,000 barrels daily too low.

The redrilling and perforating of wells at Santa Fe Springs for the Bell sand, which upper horizon had been often passed up in the rush to develop the deeper Meyer zone, was one of the factors not taken into account. According to the forecasters, that field should long ago have sunk into oblivion yet it is still yielding nearly 50,000 barrels of refinable crude daily.

It was found in 1924 in the San Joaquin Valley heavy oil district that wells shut-in during the Los Angeles Basin flush of the previous year, came back on production with increased yields. This resulted from the accumulation of pressure in the producing horizon, the increased yield amounting to roundly 10 per cent for the first 60 days. Thereafter, it was found that production adjusted itself to approximately the normal curve prevailing before the shutting-in of wells.

Notwithstanding that experience the beginning of 1926 finds one estimator assuming that the present 60,000 barrels of shut-in possible production can be gradually absorbed without increasing California's total daily average materially.

The accompanying Table 2 deals entirely with Southern California fields, their total yields from the beginning of productivity and per acre recoveries. As the per acre yields are figured on the basis of the proved ground throughout the fields the relatively higher recoveries on individually rich properties are not reflected.


constant source of supply
constant experimenting
constant production
constant uniform crude
Guaranteed 100% PURE
PENNSYLVANIA
EMPIRE
Constantly Improving—
Consistently Uniform—
Continually Serving—
. . . . . Three real reasons why it pays to deal with Empire.
The fact that we have a definite, ample supply of Pure Pennsylvania Crude at our disposal—a refining organization composed of men thoroughly familiar with this one high grade oil, and the facilities to properly refine this crude at a low production cost—is your insurance of uniformity in every shipment, and quite naturally uniform satisfaction to you—dependable profits from resales.
Prompt attention is given any order from a can to a carload, whether we do the compounding or whether we ship in bulk for your compounding.
THE EMPIRE OIL WORKS, Inc.
Oil City Pennsylvania
Refinery: Reno, Pa.
Warehouses at strategic shipping points
Tractor Oils
Industrial Oils
Kerosene
Gasoline
Petrolatum
Motor Oils
EMPIRE
When You Buy Empire You Get The Best.

Results——Results——Results

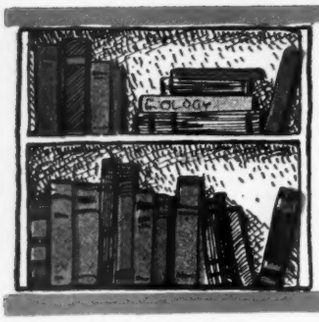
Classified Advertising

Let just one of our advertisers tell you what his advertising accomplished. "We have had 27 replies to our advertisement." The writer further says "It was an unusually good class that answered this advertisement and replies were received from as far north as Saskatoon, and west to the Pacific Coast."

Write us today about your advertisement.

National Petroleum News

812 Huron Rd. Cleveland, Ohio



Oil Man's Bookshelf

A successful department head remarked the other day:

> "I find it necessary to keep up a constant program for *self improvement* in order to prevent my becoming obsolete so far as my value to my company is concerned."

And to the study of the best books on his work, he attributed a good share of his advancement.

The OIL MAN'S BOOKSHELF will help you select books on oil that you can read with the greatest profit. If you do not find the subject you are interested in below, write us.

ACCOUNTING for the PETROLEUM INDUSTRY

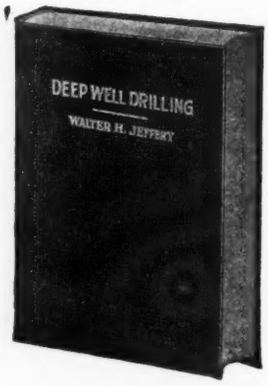
"Accounting for the Petroleum Industry" by D. F. Morland and R. W. McKee, is one of the most practical and comprehensive works on accounting principles and procedure for all branches of the oil industry — production, transportation and storage, refining, marketing.

Accounting for each branch is discussed separately; description of technical practices is given, and the accounting problem to be solved in each activity is set forth together with sample forms in use; tables for depreciation rates, etc.

For refinery accounting this book recommends the "weighted selling ratio method" which is described in detail and which has the advantage of determining for every product a cost which will allow for a reasonable profit when disposition is made thereof.

"Accounting for the Petroleum Industry" is carefully prepared and the most practical book written on the subject of accounting for the oil business.

304 pages—Price $4.00



The second edition of "Deep Well Drilling" by Walter H. Jeffery is just out. The material in the first edition has been rewritten thruout with several new chapters on improvements in the art of drilling.

"Deep Well Drilling" discusses exhaustively cable tool drilling, rotary drilling, core drilling in all their phases; tells how to fish for lost tools; how to case, how to use packers, how to cement and how to shoot; how to plan operations intelligently; specify material, etc.

Every man engaged in the production of oil should have a copy. 648 pages, illustrated, price $6.00.

RECOVERY of GASOLINE from NATURAL GAS

A glance over a few of the chapter headings indicates how thoroughly the author, George A. Burrell, goes into the subject of "Recovery of Gasoline from Natural Gas" in his new book:

Occurrence of gasoline in natural gas—Applying "vacuum" to wells —Gas leases—Chemistry and analysis of natural gas—Testing for gasoline content—Measuring—Gas carrying capacity of pipe lines—Compression method—Absorption process—Charcoal process — Extraction from Residue gas—Blending—Fractionating columns — Depletion—Removal of Hydrogen-Sulfide—Sulfur—Relation between vapor tension and distillation loss — Shipping losses — Gasoline loading apparatus — Insulating gasoline storage tanks—Accidents in transporting—Hazards in gasoline plants—Gas engines and compressors—Horse power required to compress — Steam boilers — Steam engine — Pumps used in gasoline recovery—Water cooling systems — Pipe for natural gas plants—Tanks—Regulators, relief valves, traps, thermostats, meters —Construction and operating costs of plants—Fuel economy—Depletion of properties—Other motor fuels than gasoline—Testing gasoline—etc.

590 pages, 210 illustrations, price $7

Cut out and mail

National Petroleum News,
837 Caxton Bldg., Cleveland, Ohio.

I want the books checked below. Enclosed is check or money order for $_____

☐ *Accounting for the Petroleum Industry* by R. W. McKee $4.
☐ *Deep Well Drilling* by W. H. Jeffery $6.00.
☐ *Recovery of Gasoline from Natural Gas* by G. A. Burrell $7.

NAME _____

Address _____

_____

_____

ON THE LAZY BENCH

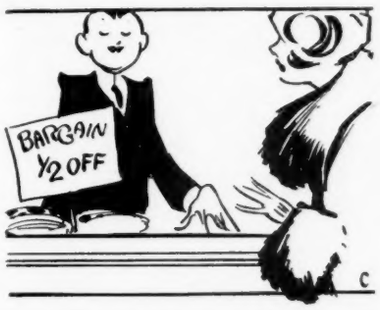
National Petroleum News

HE WAS NOT A GARDENER

Wife: "You managed to find something to eat didn't you, darling?"

Hubby: "Oh, yes, I found the steak in the ice-box and fried it with some onions I found in the cellar."

Wife: "Onions! Good gracious, you've eaten my bulbs."



IRRESISTIBLE

"I don't think Helen looked very high to marry a clerk."

"Oh, but he was irresistible. She found him at a bargain counter."

❦ ❦ ❦

Oh! Slush

"He kissed me, and I told him to tell no one."

"And what did he do?"

"Why, it wasn't two minutes before he repeated it."

—Humorist (London).

❦ ❦ ❦

THAT'S ALL THERE IS

"Once there was a bird called the moa."

"Yeh?"

"Yeh, it's extinct now. There is no moa."

❦ ❦ ❦

Study This

"Divorces are practically unknown in Sweden," says a newspaper.

Perfectly natural in the land of safety matches.

—Klodhans (Copenhagen).

❦ ❦ ❦

Hero—"Cur! Where are those papers?"

Villain—"They are at the blacksmith's."

Hero—"Ha! You are having them forged."

Villain—"No, I am having them filed."

❦ ❦ ❦

"Abie, what is a pauper?"

"It's the guy what married mommer."

—Bridgeport Driller

Not Cheap

J. A. McCulloch after a short visit in Dubuque writes in to McDonald's as follows:

"I am enclosing the hotel bill."

Manager's reply—"Hotel bill received and we are inclosing check, but do not buy any more hotels at this figure for they are cheating you."

—The Unloading Rack

❦ ❦ ❦

Enough

Jimmie—"Say, Charlie, is there any difference between Addition and Subtraction?"

Charlie—"Sum."

—Sane Gene, (Paris).

❦ ❦ ❦

NOT SERIOUS

Ikey (reading a report of a football game): "I see where your son lost twenty yards."

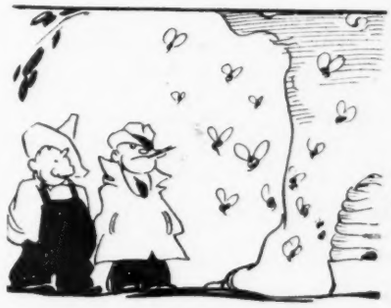
Abie: "Vot? So careless. Vell, mebbe it was only gingham."

❦ ❦ ❦

Officer, what was all that noise down the street?"

"Oh, a motorist turned a corner where there wasn't any corner."

—Ventura Mission



A COLORADO SINGER

City Guy (on farm near Denver)—"Why are those bees flying around so frantically?"

Farmer—"I guess they have hives."

—The Unloading Rack

❦ ❦ ❦

"58-60"

It's "Petrol", they tell you in London
In Rome, it is called "Benzine".
"Essence" they ask for in Paris;
But here, it's just plain "Gasoline".

◈ ◈ ◈

"Well, Mr. Meyer, why do you want to sell your nightshirt?"

"Because I have got a job as a night-watchman."

—Der Brummer (Berlin).

PETROLEUM
and its Products

WRITE OR WIRE
FOR QUOTATIONS

Marietta, Ohio Refinery
operated on Pennsylvania Crude

Findlay, Ohio Refinery
operated on Ohio Crude

Coffeyville, Kansas Refinery
operated on Midcontinent Crude

The
NATIONAL REFINING Co.
National Headquarters
NATIONAL BLDG.
CLEVELAND OHIO

3 MODERN REFINERIES
COFFEYVILLE, KAN.-FINDLAY, O.
MARIETTA, O.

2-PIECE CASES

393 Folio and inner Case, Net $14.85

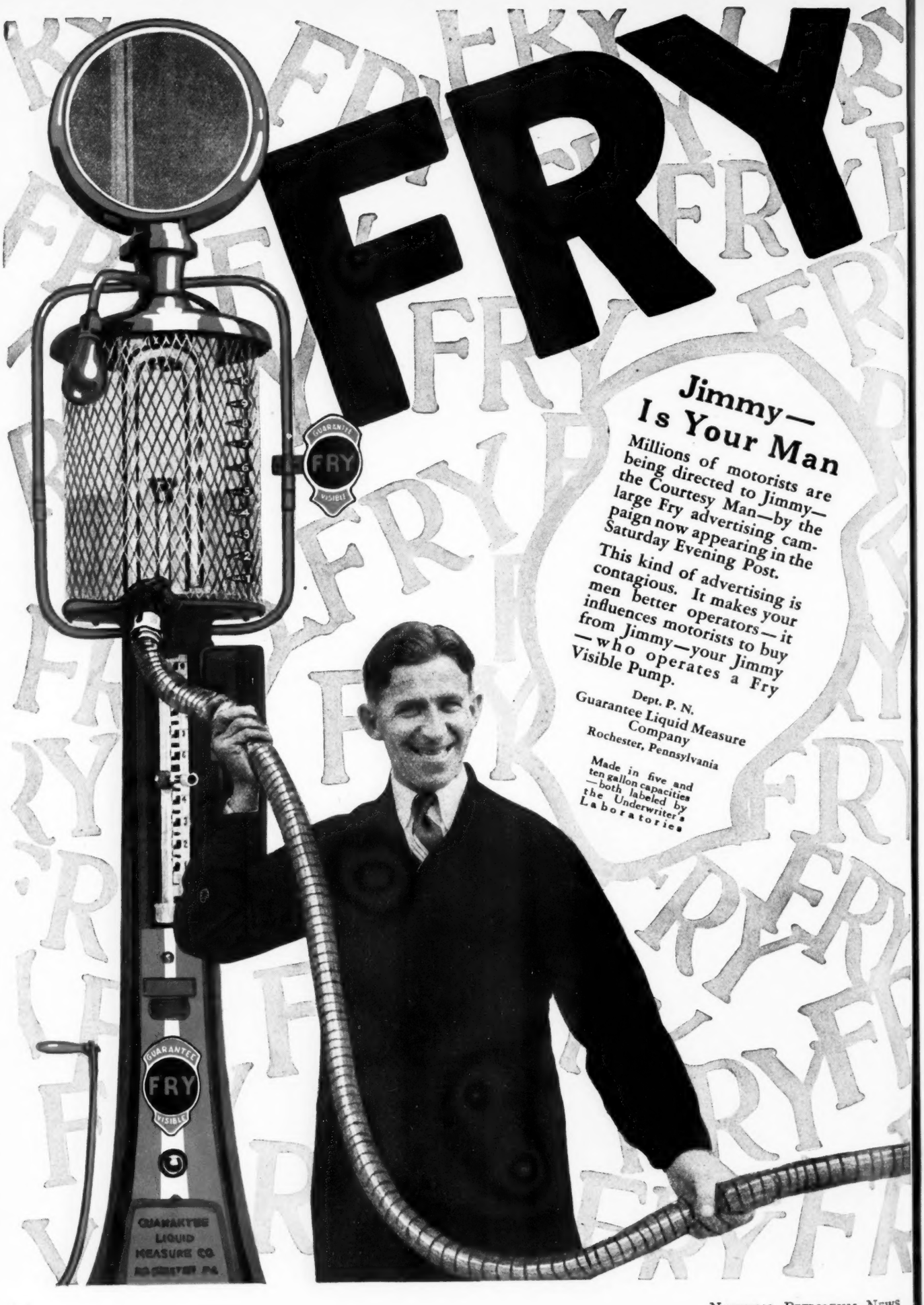
Made from heavy black cowhide with stiffened bottom, reinforced with metal studs. Extension lock and strong, comfortable handle. There are 3 roomy pockets for stationery and Inner Case, which has a handle and may be carried separately. It is velvet lined with compartment containing 9 four oz. bottles and 4 one half oz. jars. Your name embossed in gold *free*. Satisfaction guaranteed or your money returned.

Other Styles in our FREE Catalog

L-U-C-E

Builders of Sales Luggage
614 Delaware KANSAS CITY, MO.

FRY



Jimmy— Is Your Man

Millions of motorists are being directed to Jimmy—the Courtesy Man—by the large Fry advertising campaign now appearing in the Saturday Evening Post.

This kind of advertising is contagious. It makes your men better operators—it influences motorists to buy from Jimmy—your Jimmy—who operates a Fry Visible Pump.

Dept. P. N.
Guarantee Liquid Measure Company
Rochester, Pennsylvania

Made in five and ten gallon capacities—both labeled by the Underwriters' Laboratories

Refinery - Tank Wagon Markets

National Petroleum News

Refiners Being Pinched by Dear Crude and Cheap Gasoline

Staff Special.

TULSA, Feb. 22

MID-CONTINENT refiners this week have been forced considerably further into the "squeeze" between high priced crude and low priced refined products, with lack of demand tieing their hands and no sign of relief in sight.

There have been a few bright spots such as export buying of 60-62, 400 end point gasoline in Oklahoma and Kansas, the continued high price of kerosenes, the fair demand for gas oil and distillates, and the scarcity of higher gravity fuel oils, but even these bright spots have reflected upon only a relatively small number of refiners. For the majority the week has been a slow but steady pinching off of profits as gasoline prices sagged, with many plants running "in the red" or dangerously near it as the week closed.

The export buying of 60-62, 400 e. p. gasoline was started Thursday afternoon by the Imperial Oil Marketing Co. and the Bell Oil & Gas Co. for the account of the New Orleans Refining Co. Approximately 3,300,000 gallons were purchased from six or seven refiners in the Oklahoma and Kansas fields, at a price reported to be around 11¾ cents.

With 58-60 U. S. Motor gasoline around 10 cents on Friday, the price paid for the higher gravity material was considered fairly good, and at least one refiner who had not been cutting 60-62 gasoline booked part of the order and instructed his plant superintendent to reduce U. S. Motor gasoline output and begin making the 60-62 grade.

Coupled with the buying last week of approximately 1,500,000 gallons of export grade 64-66, 375 e. p. gasoline by the Atlantic Refining Co. from Oklahoma refiners, the New Orleans Refining Co. purchase put the refiners who can run a high gravity crude and get a high gravity gasoline into a relatively good position. But those refiners who are forced to depend primarily on their U. S. Motor and lower gravity gasolines and burning oils for revenue failed to see anything pleasant.

The New Orleans Refining Co. has been a "good angel" once before this month in the Mid-Continent field. The other time was when the company suddenly came into the market for a large quantity of natural gasolines, buying up most of the material ready for immediate shipment, and booking still more for over-February delivery. Estimates of the total volume purchased by the company this month run as high as 1,000 cars. This figure includes goods under contract as well as spot purchases.

While kerosenes failed to climb as rapidly this week as they had during the previous weeks this year, the goods remained as scarce, and the price even stronger. Demand for gas oil perked up, with the result that diligent combing of the field revealed the bulk of this oil is in the hands of a relatively few refiners and two or three marketers. Scarcity of higher gravity fuels became more noticeable this week, but the low gravity grade was plentiful.

The squeeze into which the refiners are headed has not become acute as yet, but nevertheless is causing some concern, and is fulfilling a prediction generally made when the talk of a crude advance early in the year was first heard.

At that time most refiners expressed hope that any crude changes would not be made before early spring. They expected a comparatively dull February, and were reconciled to such a condition. They believed that if crude was not raised until around March 1 or 15, they could by that time have the foundation of a steadily increasing business upon which to build their higher prices. It was generally believed that the higher prices could then be held without a lull through the period of greatest demand and consumption.

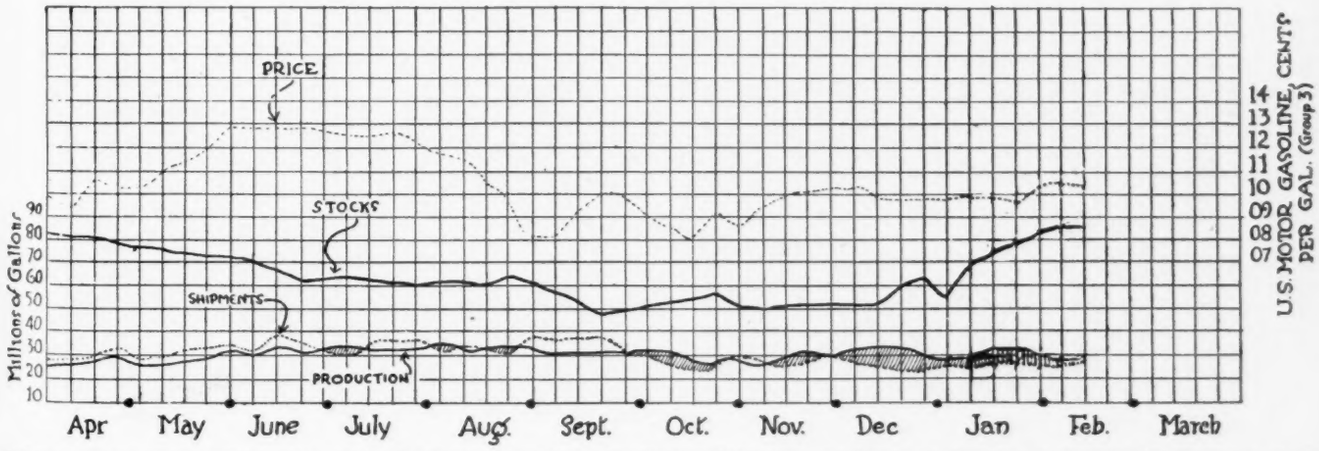
Crude Advance Not Delayed

But the crude advance wasn't delayed. Consequently the refiners, just at the dullest period are forced to pay more for their crude, while receiving only a fraction of a cent more for some of their refined products, while others are actually selling under the prices prevailing just before the crude raise.

The small skimming plant refiners have been squeezed the hardest. Forced

(Continued on page 117)

Barometer of the Mid-Continent Gasoline Market



Relation of the Group Three price of U. S. Motor Gasoline to Production, Shipments and Stocks of Gasoline at the 124 Mid-Continent plants reporting their figures weekly to National Petroleum News.

the pearl in the oyster

NATURAL GASOLINE is the pearl in the oyster of the Petroleum Industry.

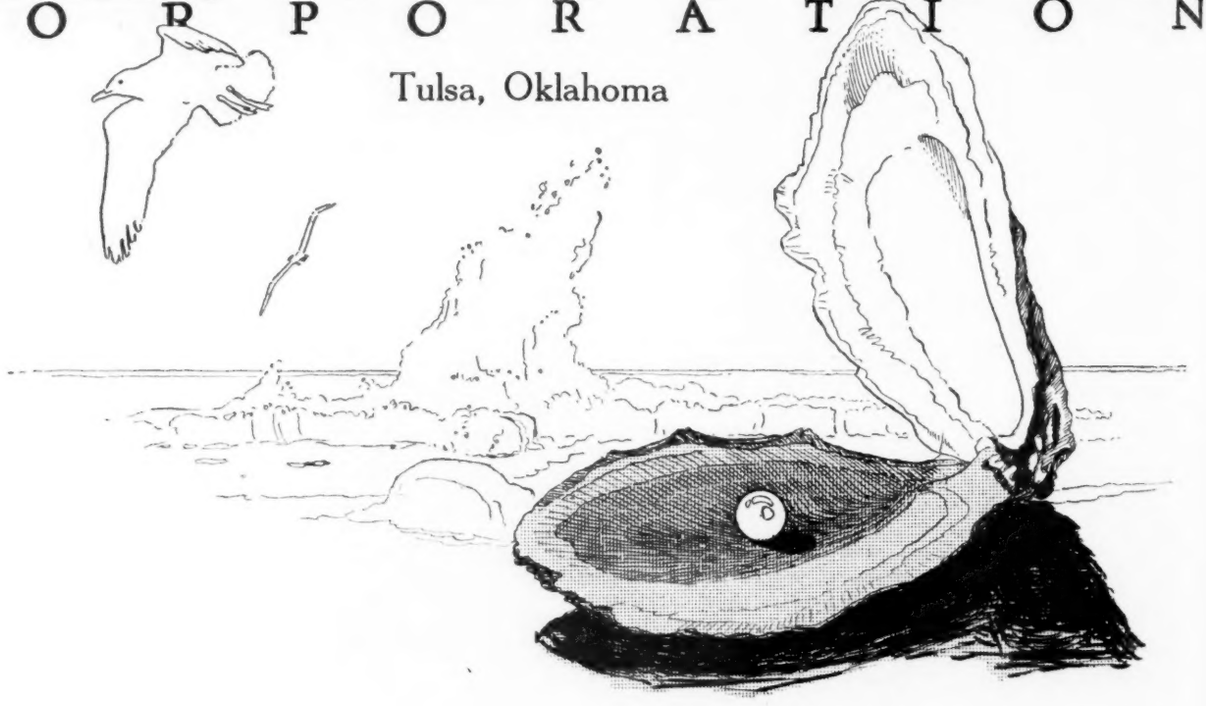
It makes possible a greater volume of good motor fuel than would otherwise be available because of the quality deficiencies left by improved fractionation.

It balances quantity with quality and is an indispensable instrument in maintaining the volume on a quality basis.

A high test gas is a necessity for the quick starting of motors in the winter time. NATURAL GASOLINE, added to refined gasoline, increases the volatility and therefore produces a motor fuel for which there is a greater demand.

CHESTNUT & SMITH CORPORATION

Tulsa, Oklahoma



Refinery Markets on Light Oils and Lubricants

Pennsylvania, Oklahoma, North and South Texas, Louisiana, Arkansas, California

GASOLINE AND NAPHTHA

PENNSYLVANIA	Prices Feb. 22	Prices Feb. 15	Prices Feb. 8
52-54 Naphtha	11¾-12	11¾-12	11½-11¾
54-56 Naphtha	12½-12½	12¾-12½	11¾-12
58-60 Gasoline	12½-12¾	12¾-13	12½-12¾
60-62 Straight-run gasoline	13½-13¾	13¾-14	13½-13¾
62-64 Straight-run gasoline	14¼-14½	-14½	-14½
64-66 Straight-run gasoline	14¾-15¼	14¾-15¼	14½-15
68-70 Straight-run gas. 350-360 E.P.	15¾-16¼	15¾-16¼	15¾-16
68-70 Straight-run gas. 305-320 E.P.	-20	-20	-20
70-72 Straight-run gas. 300-305 E.P.	-21	-21	-21
OKLAHOMA			
48-50 450 E. P. naphtha	9¼- 9½	9½- 9¾	- 9¾
50-52 450 E. P. naphtha	9¼- 9½	- 9¾	9¾-10
56-58 450 E. P. gasoline	- 9¾	-10	10¼-10½
56-58 U. S. Motor gasoline	9¾-10	10 -10¼	10¼-10½
58-60 U. S. Motor 437 E. P.	10 -10¼	10¼-10¾	10½-10¾
60-62 400 E. P. gasoline	11¾ 12	11¾-12¼	-12¼
64-66 390 E. P. gasoline	12 -12¼	12¼-12½	-13
64-66 375 E. P. gasoline	12½-12¾	12½-13	13 -13½
68-70 350-360 E. P. gasoline	13¼-13½	13½-13¾	13¾-14
64-66 437 E. P. blend	-10	-10½	10½-10¾
KANSAS*			
58-60 U. S. Motor gasoline	10¾-10¾	-11	11 -11¼
60-62 400 E. P. gasoline	12 -12¼	12¾-13	-12½
64-66 375 E. P. gasoline	-13	13 -13½	13½-13¾
*F. O. B. refinery, Kansas destination.			
NORTH TEXAS			
48-52 450 E. P. naphtha	- 9¼	9¼- 9½	9¼- 9½
56-58 450 E. P. gasoline	9¾- 9¼	9¾- 9¾	- 9¾
58-60 450 E. P. gasoline	9½- 9¾	9¾-10	-10
56-58 U. S. Motor gasoline	9½- 9¾	9¾-10	10 -10¼
58-60 U. S. Motor gasoline	9¾-10	10 -10¼	10¼-10½
60-62 400 E. P. gasoline		-	-12½
64-66 390 E. P. gasoline	12¼-12½	12¼-12½	12¾-13
64-66 375 E. P. gasoline	12¾-13	12¾-13¼	13 -13½
68-70 350-360 E. P. gasoline	-13¼	13½-13¾	-13¾
NORTH LOUISIANA			
58-60 U. S. Motor 437 E. P.	10 -10¼	-10¼	10¼-10¾
ARKANSAS			
58-60 450 E. P. gasoline	9¾-10	-10	10 -10¼
58-60 U. S. Motor gasoline	-10	-10½	10¾-11
64-66 375 E. P. gasoline	13 -13¼	13 -13¼	13¼-13¾
CALIFORNIA			
54-56 U. S. Motor gasoline	-11	-11	-11
42-45 Engine distillate, 445-480 E.P.	8 - 9	8 - 9	8 - 9

Note: This is without the 2-cent state tax included in the price of California refiners for shipments within the state.

NEW ENGLAND
(F. O. B. Boston and Fall River)

U. S. Motor gasoline	-13¼	-13¼	-12¾

NATURAL GASOLINE

(Note: End point of all grades, not over 375° F.)

OKLAHOMA			
Grade Double A	9¾-10	-10	-10
Grade A	-10	-10¼	10¼-10¾
Grade Double B	- 9	9 - 9¼	- 9
Grade B	- 9	9 - 9¼	9 - 9¼
Grade C	8½- 8¾	8½- 8¾	8½- 8¾

NOTE—Specifications adopted by Ass'n of Nat. Gaso. Manufacturers
Grade Double A—80-87.9 gravity, 90% recovery, not over 375 E. P.
Grade A—72-79.9 gravity, 90% recovery, not over 375 E. P.
Grade Double B—84-92 gravity, 85% recovery, not over 375 E. P.
Grade B—76-83.9 gravity, 85% recovery, not over 375 E. P.
Grade C—80-90 gravity, 78% recovery, not over 375 E. P.

NORTH LOUISIANA			
Grade Double A	10½-10¾	10¾-11	10 -10½
Grade Double B	9½- 9¾	9¾-10	9½- 9¾
Grade C	- 9¼	9¼- 9½	8¾- 9
F. O. B. Monroe District.			
NORTH TEXAS			
*Grade Double A	9¾-10	10 -10¼	-10
*Grade A	9¾-10	10 -10¼	10 -10¼
*Grade Double B	- 9¼	- 9¼	9 - 9¼
*Grade B	- 9¼	- 9¼	9 - 9¼
*Grade C	8¼- 8¾	8¾- 9	8¾- 9
*F. O. B. Breckenridge.			
CALIFORNIA			
73-78° 375 E. P.	15 -15½	15 -15½	15 -15½
PENNSYLVANIA			
68-70 Grav. 437 E. P.	13½-14	13½-14	13¾-13¾
64-66 Grav. 437 E. P.	13½-14	13½-14	13 -13½
60-62 Grav. 437 E. P.	13 -13½	13 -13½	12½-13
68-70 Grav. 420 E. P.	14 -14½	14 -14½	14 -14½

BURNING OILS

PENNSYLVANIA			
45 Water White Kerosene	8¾- 9	8½- 8¾	7¾- 8¼
46 Water White Kerosene	9½- 9¾	9 - 9½	8½- 9
47 Water White Kerosene	10 -10¼	- 9¾	9 - 9½
300 Burning Oil	- 8½	8¼- 8½	- 8
OKLAHOMA			
41-43 Water White Kerosene	6¾- 6¾	- 6¾	6¼- 6½
42-44 Water White Kerosene	7 - 7¼	7 - 7¼	6½- 6¾
KANSAS			
41-43 w. w. kerosene	7 - 7¼	6¾- 7	6½- 6¾
42-44 w. w. kerosene	- 7½	7¼- 7½	7 - 7¼

NORTH TEXAS	Prices Feb. 22	Prices Feb. 15	Prices Feb. 8
41-43 Water White Kerosene	6½- 6¾	6½- 6¾	- 6¾
42-44 Water White Kerosene	.....	.....	- 6½
NORTH LOUISIANA			
41-43 Water White Kerosene	7¾- 7½	7 - 7½	6¾- 6¾
ARKANSAS			
41-43 Water White Kerosene	7 - 7½	7 - 7½	- 6¾
CALIFORNIA			
40-42 Water White Kerosene	5 - 5½	5 - 5½	5 - 5½
NEW ENGLAND			
40-43 Water White Kerosene	.....	.....	.....

NEUTRAL OIL

PENNSYLVANIA			
(Viscosity at 70° F.)			
220 Vis. No. 8 Assoc. Filt.	-29	-29	-28½
200 Vis. No. 8 Assoc. Filt.	27 -28	26½-27	26 -26½
180 Vis. No. 8 Assoc. Filt.	-25	24½-25	24 -24½
150 Vis. No. 8 Assoc. Filt.	21 -22	20½-21	20 -20½
(Non-Viscous)			
34 Grav. 350-360 Flash	8½- 8¾	8½- 8¾	8 - 8½
36 Miners Neutrals 300-305 Flash	- 7¾	- 7¾	7½- 7¾
OKLAHOMA			
(Viscosity at 100° F.)			
100 Vis. No. 2 color	7 - 7½	7 - 7½	6½- 7
150 Vis. No. 3 color	10 -11	10 -11	10 -11
150 Vis. No. 4 color	- 9¾	- 9¾	- 9¾
180 Vis. No. 3 color	10 -10¾	10 -10¾	10¾-10¾
180 Vis. No. 4 color	10½-11	10½-11	-10½
180 Vis. No. 5 color	9 -10¼	9 -10¼	9 -10¼
200 Vis. No. 3 color	11 -12	11 -12	11½-13½
200 Vis. No. 4 color	-11½	-11½	-11½
200 Vis. No. 5 color	10 -11½	10 -11½	10 -11¼
220 Vis. No. 3 color	12½-12¾	12½-12¾	-12¾
220 Vis. No. 4 color	13 -13¼	13 -13¼	13 -13¼
220 Vis. No. 5 color	-12¾	-12¾	-12¾
240 Vis. No. 3 color	14¼-15	14¼-15	15 -16
240 Vis. No. 4 color	-14½	-14½	-14½
240 Vis. No. 5 color	-14	-14	-14
280 Vis. No. 3 color	15¾-17	15¾-17	-17
280 Vis. No. 4 color	-16½	-16½	-16½
280 Vis. No. 5 color	-16	-16	-16
300 Vis. No. 5-6 color	17 -18½	17 -18½	17 -18½
GULF COASTAL			
(Viscosity at 100°F; cold test 0)			
100 Vis. No. 2 Color Unfilt. Pale	7½- 8	7½- 8	7½- 8
200 Vis. No. 3 Color Unfilt. Pale	11½-12	11½-12	11½-12
300 Vis. No. 3 Color Unfilt. Pale	13½-14	13½-14	13½-14
500 Vis. No. 3½ Color Unfilt. Pale	15½-16	15½-16	15½-16
750 Vis. No. 4 Color Unfilt. Pale	19½-20½	19½-20½	19½-20½
200 Vis. No. 3½ Color Red Oil	10 -10½	10 -10½	10 -10½
300 Vis. No. 5½ Color Red Oil	12 -12½	12 -12½	12 -12½
500 Vis. No. 6 Color Red Oil	13½-14	13½-14	13½-14
750 Vis. No. 6 Color Red Oil	18 -18½	18 -18½	18 -18½
CALIFORNIA			
(Viscosity at 100° F.)			
100 Vis. No. 2 color	11 -11½	11 -11½	13½-14½
100 Vis. No. 3 color	8½- 9	8½- 9	9 -10
200 Vis. No. 3 color	13½-14	13½-14	14½-15½
300 Vis. No. 3 color	15 -15½	15 -15½	14 -16
450 Vis. No. 3½ color	18 -18½	18 -18½	19½-20½
550 Vis. No. 3 color	20 -21	20 -21	21½-22½
600 Vis. No. 3½ color	21 -22	21 -22	23½-24½
100 Vis. No. 5 color	7 - 7½	7 - 8	8 - 9
200 Vis. No. 5 color	12 -12½	12 -12½	13½-14½
300 Vis. No. 5 color	13 -13½	13 -14	14 -15
400 Vis. No. 5 color	15 -16	15 -16	16 -17
500 Vis. No. 5 color	16 -17	16 -17	17 -18
600 Vis. No. 6 color	17 -18	17 -18	18 -19
700 Vis. No. 7 color	18 -19	18 -19	19½-20½

CYLINDER STOCKS

OKLAHOMA			
190-210 Vis. at 210° Bright Stock	31 -35	31 -35	31 -35
150-160 Vis. at 210° Bright Stock	28 -31	28 -31	28 -31
600 E Stock, 140-150 Vis. @ 210°	18 -20	18 -20	18 -20
600 Steam Refined Olive Green	9 -11½	9 -11½	8½-11
600 Steam Refined Dark Green	6½- 8	6½- 8	6½- 8
Black Oil	- 5	- 5	- 5
PENNSYLVANIA			
(1-inch Immersion Test)			
600 Steam Refined	18 -19	18 -19	18 -18½
635 Steam Refined	21 -22	21½-22	21 -22
650 Steam Refined	22½-23½	23½-24	23 -24
600 Flash	26 -27	26½-27	26 -27
625 Flash Steam Refined	-36	-36	
600 Warren E	21½-22½	-22½	21½-22
600 Oil City E	-20½	-20½	20½-21
600 Filtered D	27 -28	27 -28	-28
Cold Test Stocks (bright filtered)	38½-39	38½-39	38½-39
Cold Test Stock (dark filtered)	36½-37	36½-37	36½-37
Black Oil	- 8	- 8	- 8

(Note—Prices of total immersion test goods average 1 to 3 cents per gallon higher.)

Above prices are f. o. b. refinery in tank car. They are the prices at which the bulk of the products on the open market move. Whoever has knowledge of any open market prices on any considerable quantity of goods differing from the foregoing, will favor us with this information.

Available for
IMMEDIATE SHIPMENT

450 Bright Stock

Sharples Process

100% Pennsylvania Crude

Guaranteed 100% PURE PENNSYLVANIA OIL

Permit No. 31

Specifications

Flash: 450
Fire: 510
Viscosity at 210: 80-85
Gravity: 28
Cold Test: 25-30
Color: No. 7

This stock can be delivered straight or blended to your specifications with 100% Pennsylvania Crude Neutrals.

For shipment in tank cars, compartment tank cars, barrels or drums. For quotation write to

The FREEDOM OIL Works Company, Freedom, Pa.
Refineries at Freedom and Coraopolis

Freedom Quality Stocks
600 Steam Refined
635 Steam Refined
650 Steam Refined

Freedom Filtered Neutrals
Freedom 300 Mineral Seal Oil
made to Railroad Specifications
Freedom Filtered Burning Oil

Refinery Markets on Wax and Heavy Oil Products

Pennsylvania, Oklahoma, North and South Texas, Louisiana, Arkansas, California

WAX

PENNSYLVANIA	Prices Feb. 22	Prices Feb. 15	Prices Feb. 8
	(Per Pound, New York)		
122-124 White Crude Scale..	– 5⅜	– 5⅜	– 5⅜
124-126 White Crude Scale..	– 5½	– 5½	– 5½
OKLAHOMA			
	(Per Pound, Group 3)		
124-126 White Crude Scale..	5 – 5⅛	5 – 5⅛	4⅞– 5
CALIFORNIA			
White Crude Scale.....	6 – 6¼	6 – 6¼	6 – 6¼

FUEL OIL

PENNSYLVANIA			
36-40 Fuel Oil.....	6 – 6¼	6¼– 6½	6 – 6½
30-34 Fuel Oil.....	5¾– 5⅞	5¾– 5⅞	5¾– 6¼
28-30 Fuel Oil.....	5¾– 5⅞	5¾– 5⅞	5¾– 6
OKLAHOMA			
38-40 Straw distillate.....	4 – 4⅛	– 4	– 4
36-38 Straw distillate.....	3¾– 3⅞	3¾– 3⅞	3¾– 3⅞
32-36 Gas oil (Gal.).....	– 3¾	– 3¾	– 3¾
26-30 Fuel oil (Bbl.).....	1.27½–1.30	1.27½–1.30	1.27½–1.30
22-26 Fuel Oil (Bbl.).....	1.17½–1.22½	1.17½–1.22½	1.20 –1.22½
18-22 Fuel oil (Bbl.).....	1.15 –1.17½	1.15 –1.17½	1.17½–1.20
KANSAS*			
38-40 Light straw distillate..	4⅛– 4⅜	4¼– 4½	4¼– 4½
36-38 Light straw distillate..	4 – 4⅛	4 – 4⅛	4 – 4⅛
32-36 gas oil.....	3¾– 4	3¾– 4	3¾– 4
18-22 Fuel oil.....	1.17½–1.22½	1.20 –1.25	1.20 –1.25
24-26 Fuel oil.....	1.22½–1.30	1.25 –1.35	1.25 –1.35

*F. O. B. refinery Kansas destination.

NORTH TEXAS	Prices Feb. 22	Prices Feb. 15	Prices Feb. 8
36-40 Straw Distillate.....	3¾– 3⅞	3½– 3¾	3¾– 3⅞
32-36 Gas Oil (Gal.).....	3½– 3¾	– 3¾	3½– 3¾
24-26 Fuel per (Bbl).....	1.25 –1.30	1.22½–1.30	1.25 –1.30
GULF COASTAL			
Fuel.....	1.55 –1.65	1.55 –1.65	1.55 –1.65
Gas Oil.....	– 5¼	– 5¼	– 5
NORTH LOUISIANA			
32-36 Light Gas Oil (Gal.)...	3¾– 4	3¾– 4	3¾– 4
16-20 Fuel Oil (Bbl.).....	1.15 –1.20	1.15 –1.20	1.10 –1.15
ARKANSAS			
32-36 Gas Oil.....	3¾– 4	3¾– 4	3¾– 4
Road oil.....	–1.26	–1.26	–1.26
Smackover Crude Fuel.....	1.15 –1.25	1.15–1.25	–1.15
CALIFORNIA*			
14-18 Fuel Oil (Bbl.).....	1.00	1.00	1.00
14-18 Bunker Oil (Bbl.).....	1.00	1.00	1.00
24-30 Gas Oil (Bbl.).....	1.15	1.15	1.15
27 + Diesel Oil (Bbl.).....	1.15	1.15	1.15

*(San Joaquin Valley, San Francisco 4c per bbl. more.)

NEW ENGLAND (F. O. B. Boston and Fall River)			
30-32 gas oil (gal.).....	– 5¾	– 5⅞	– 5¾
Fuel Oil (Bunker C) bbl.....	–1.83	–1.83½	–1.82

Above prices are f. o. b. refinery in tank car. They are the prices at which the bulk of the products on the open market move. Whoever has knowledge of any open market prices on any considerable quantity of goods differing from the foregoing, will favor us with this information.

(Continued from page 113)

in many instances to pay cash for their crude, they have found it difficult to move their gasoline, especially in competition with marketers who had filled their tanks before prices were raised and who have been willing to sell under the refiners knowing that they still would make a comfortable profit.

While not so closely pressed, the larger refiners are not in a good position, by any means. One refiner said that with U. S. Motor gasoline at 10 cents, he still had a margin of 55 cents a barrel on his crude for overhead and operating expenses. He said, however, that due to certain advantageous conditions his plant was one of the most efficiently and economically operated in the field.

The sales manager of another refinery said this week that his plants were actually operating at a loss. Due to fuel contracts and other heavy oils showing some strength, however, he said that his plants are managing to keep just about even.

Still another sales manager declared his plants are not making anything at present if overhead is to be considered as a tangible factor. He predicted that 1926 would be a year of relatively high priced crude and relatively low priced gasoline. He is inclined to believe that another lean year is ahead for the refiners, and those who can show a 5 per cent earning on their investment will be doing exceedingly well.

The Mid-Continent no longer holds the price setting key, he argues. This area is practically surrounded now by other territories in which refiners are waiting for any opportunity to cut in the Mid-Continent's selling field. Consequently Mid-Continent refiners have to watch their step when they try to boost prices to get in line with higher crude prices.

The new Amarillo field, being opened, may eventually have a bearing on this situation, he thinks, but doubts that the field will be opened sufficiently to aid Mid-Continent refiners this year.

Other refiners have expressed a more optimistic view. February always is a slow month, they say. They believe the gasoline market under present conditions has reached the bottom. They doubt there will be much U. S. Motor gasoline sold under 10 cents during the remainder of this month. They frankly admit they can't afford to sell much at less than a dime.

Jobber buying has been below normal even for February but it is generally predicted that March will see a decided increase from that direction. A substantial reduction in crude runs will be a logical step if the squeeze gets much tighter. Such a step probably would have been taken already, one close student of the market said today, if refiners had not been clinging so tenaciously to the hope that jobber or export activity would begin almost any day. "They've been running right along," he declared, "clinging to the hope that the break for the better was near."

Natural Gasolines

The natural gasoline market has been in surprisingly good shape recently considering the dullness of the refinery market. The large percentage of total gasoline shipments from the Mid-Continent going into export channels has been an important factor in the market. The chief reason, however, has been the extraordinary purchases of the New Orleans Refining Co.

All prices and market information printed herein have been gathered by the staff of National Petroleum News from reliable sources and so far as can be ascertained thoroughly represent the going market as defined for each product on the date given for those particular prices. Both buyers and sellers have been checked in the gathering of this information and actual sales studied.

These prices and this information are subject at all times to correction for errors. Anyone having knowledge of any facts which would indicate anything different from the information which is given, is especially urged to send in those facts to the head office of National Petroleum News at once, or take them up with the nearest representative. All such facts will be promptly and thoroughly investigated.

The staff of National Petroleum News is cognizant of the fact that this market information has come to have a high standing in the industry. It wants to not only maintain that standing, but to improve it and to that end, invites the co-operation of the entire oil industry.

Weak Demand Hits Price In Chicago Market

CHICAGO, Feb. 23

GASOLINE prices have descended the scale again since last week at this time, the market having been dull all the while except for a rather consistent buying of export material. In spite of the fact that purchases have been made with reasonable regularity by exporters and domestic dealers as well, 64-66 375 e. p. is ¼ of a cent cheaper in car lots than it was a week ago but the price range has narrowed somewhat and now is 12½ to 12¾ cents.

U. S. Motor is dull at 10 to 10¼ cents a gallon through the Chicago resale market quoted on a basis of Group 3. The sentiment among the jobbers appears to be one of indifference to speculative fluctuations in the market. The recent tank wagon market advance, although popularly predicted for two days before it happened, did not bring a deluge of orders into the market. Ever since the crude advance that heralded the tank wagon boost, there have been recurring predictions of another upward revision in crude prices. But the jobbers seem just as indifferent to that rumor as to the former.

Weather conditions have not been unusually good or unusually severe for the time of year Roads have not been made impassable by mud or snow. Necessary motoring is continuing in all towns where streets are paved and it has not been made impossible on country roads except in certain sections where snow has been unusually heavy. Minnesota and Michigan have had some severe weather the last week and the temperature has fallen two or three degrees below zero at points in North Dakota and Wisconsin but on the whole it has been mild winter weather. The heavy general snow last Friday however will certainly prove a deterrent to gasoline consumption.

The official weather forecast for the week ending Feb. 27 does not hint of much improved conditions. In the region of the Great Lakes, the weather man says, cold will be severe early in the week with frequent rains or snows until the last of the week when a thaw is indicated.

In the Ohio River valley and Tennessee the weather will be warm and wet with a cold snap about Wednesday. In the trans-Mississippi region the weather will be mostly fair and temperatures mild except for a cold wave early in the week and some precipitation about Wednesday.

Burning oils are scarce and firm and the demand has been fair. Altogether the price might be called steady at 6⅞ to 7¼ cents covering both grades. Material of 41-43 gravity is a shade higher in price than it was last week at 7 cents or a little below, while 42-44 gravity goods are quoted at 7¼ cents flat. Last week that figure could be shaded a trifle. This narrowing of the range in kerosene prices is attributable chiefly to the jobbers' attention being diverted from the rare 42-44 to the more available 41-43.

The distillate market continues easy and prices have not changed appreciably since last week. The ruling quotation is still 4 cents a gallon. Mild temperatures have held the demand to a normal one and business has been rather slow. Gas oil has shown a slight improvement; at least it is firm to strong at last week's prices of 3¾ to 3⅞ cents a gallon. Straw colored gas oil is scarce and not offered freely by refiners. In fact, a few of them are asking 4 cents a gallon for it, a price equal to the going price on 38-40 distillate.

Light fuel oils have firmed up slightly over the past week. The movement which has been most conspicuous in gas oil has had its effect on 22-26 fuel oil also. That material was steady at $1.22½ last week but has firmed up until that is the low range and some refiners are asking $1.25. Heavier fuel oils are not so strong. Oklahoma refinery fuel of 18-22 gravity is easy today at last week's price of $1.17½ to $1.20 a barrel and Smackover crude fuel slid down to $1.10 flat on competitive offers.

PLATT'S
OILGRAM
Petroleum Markets-Every Day

22 Price-changes since Feb. 1st

WHEN and where will the next tankwagon or crude change be? Is there a tankwagon advance *today* in another territory which may indicate an advance coming in mine?

What are the exact prices at which gasoline and kerosene moved in the past 12 hours? Or lubricating oils, or export prices at the Gulf and New York?

You'd know the answer to these questions *this morning*, if you had the OILGRAM on your desk. It's your protection against quick changes in the market situation.

If you ever needed to keep in daily contact with the oil markets—IT IS NOW—22 price-changes since Feb. 1st.

30c a day will bring this fast daily market service to you, $75 a year, or $25 for 3 months. Order your service from the nearest mailing point—TODAY.

TULSA—608 Bank of Commerce Bldg.
CHICAGO—360 N. Michigan Ave.
CLEVELAND—833 Caxton Bldg.

Week's Price Changes Tank Wagon Markets

Gasoline Changes

Standard of Kentucky—T.w. and s.s. prices advanced 2 cents, Kentucky, to cover increase in gasoline road tax which now totals 5 cents per gallon, Feb. 21.

Canada—T.w. and s.s. prices advanced 1 cent throughout Canada, Feb. 17.

Kerosene Changes

Standard of New Jersey—The 1 cent general advance on kerosene prices on Feb. 8 throughout territory, brought all points carried in the tank wagon table on the opposite page to 15 cents. Annapolis was advanced 1½ cents, Washington, D. C. 2 cents, and Baltimore 4 cents.

Standard of New York—Rochester kerosene price in last week's issue was shown erroneously as 16 cents. This should have been 14 cents. On Jan. 26, price was reduced 2 cents to 13 cents and on Feb. 9 advanced 1 cent to 14 cents.

Magnolia Petroleum—Although Magnolia announced that on Feb. 9 it had advanced kerosene in Texas and Oklahoma to 12 cent level, its revised price list of that date shows that Fort Worth and San Antonio were advanced only 1 cent to 11 cents, and Muskogee, Okla., advanced 1 cent to 10 cents. Kerosene was advanced 1 cent at Arkansas points, Feb. 15, bringing Fort Smith and Little Rock to 14.5 cents, and Texarkana to 13 cents.

Standard of Louisiana—The advance of Feb. 12, which was from 1 to 2 cents in Tennessee, was as follows at the points in that state carried in National Petroleum News tank wagon table: Bristol, 1 cent advance, bringing t.w. to 19.5 cents, s.s. to 22.5 cents; Chattanooga and Nashville, 1½ cents, t.w. to 18.5 cents and s.s. to 21.5 at both points; Knoxville, 1 cent, bringing t.w. to 19 cents and s.s. to 22 cents; and Memphis, 1½ cents, bringing t.w. to 18 cents and s.s. to 21 cents.

New Pool in Shackleford

N. P. N. Fast Wire

HOUSTON, Feb. 23.—Roeser & Pendleton's No. 1 Cook test in Survey 85, northwest of Albany some five miles, opened a shallow Shackleford county pool Saturday when it came in at 1242 feet flowing 40 barrels an hour by heads. It represents the first oil production in this part of Shackleford county, although two or three gas wells had previously been drilled in the vicinity of the Cook well.

Gulf Lube Market Unchanged

HOUSTON, Feb. 23.—Currents of optimism in the Gulf Coastal lubricant market are balancing against the weak spots recently manifested with the result that prices are generally staple but do not show the expected advance. Little goods are being moved. Prices are steady.

Tank Wagon, Service Station Markets for Gasoline and Kerosene In United States Territories and Canada

BELOW are given in cents a gallon, the tank wagon price of gasoline without the special taxes levied against motor fuels by many states, the amount of the state taxes, the total tank wagon price, with tax added in and the service station or retail price of gasoline as quoted by the Standard Oil Companies in their various marketing territories. The right hand column is the tank wagon price of kerosene. By tank wagon price is meant the price to resale agents or dealers.

These Prices in Effect February 22, 1926

S.O. NEW JERSEY TERRITORY

	Gasoline T.W.	Tax	Total	S.S.	Oil T.W.
Atlantic City, N. J.	16	0	16	*	15
Newark, N. J.	16	0	16	18	15
Annapolis, Md.	16	2	18	*	15
Baltimore, Md.	16	2	18	21	15
Cumberland, Md.	16	2	18	21	15
Washington, D. C.	16	2	18	21	15
Danville, Va.	17	3	20	*	15
Norfolk, Va.	17	3	20	23	15
Richmond, Va.	17	3	20	23	15
Roanoke, Va.	17	3	20	23	15
Petersburg, Va.	17	3	20	*	15
Williamsburg, Va.	17	3	20	*	15
Charleston, W.Va.	16.5	3½	20	23	15
Clarksburg, W.Va.	16.5	3½	20	23	15
Keyser, W.Va.	16.5	3½	20	*	15
Parkersburg, W.Va.	16.5	3½	20	23	15
Wheeling, W.Va.	16.5	3½	20	23	15
Charlotte, N. C.	17	4	21	24	15
Hickory, N. C.	17	4	21	*	15
High Point, N. C.	17	4	21	*	15
Mt. Airy, N. C.	17	4	21	*	15
Salisbury, N. C.	17	4	21	*	15
Charleston, S. C.	17	5	22	25	15
Columbia, S. C.	17	5	22	25	15

*Dealers set own prices. S.O. New Jersey does not operate station.

S. O. NEW YORK

*New York City	18	0	18	22	16
Albany, N. Y.	†18	0	†18	†20	16
Buffalo, N. Y.	17	0	17	20	16
Rochester, N. Y.	†17	0	†17	†21	14
Syracuse, N. Y.	18	0	18	20	15
Boston, Mass.	18	0	18	21	16
Augusta, Me.	18	3	21	24	16
Manchester, N. H.	18	2	20	24	16
Burlington, Vt.	20	2	22	25.5	16

*In steel barrels.

†At Rochester and Albany, Standard sells two grades of gasoline, the above price applying to its Socony grade, and another grade being sold 2c below this price.

ATLANTIC REFINING

Pittsburgh, Pa.	17	0	17	*22	16
Philadelphia, Pa.	17	0	17	*22	16
Allentown, Pa.	17	0	17	*22	16
Erie, Pa.	†17	0	†17	*20	16
Scranton, Pa.	17	0	17	*22	16
Altoona, Pa.	17	0	17	*22	16
Dover, Del.	17	2	19	22	16
Wilmington, Del.	17	2	19	22	16
Providence, R. I.	18	1	19	22	16
Springfield, Mass.	18	0	18	20	16
Worcester, Mass.	18	0	18	20	16
Hartford, Conn.	18	2	20	23	15
New Haven, Conn.	18	2	20	23	16
Boston, Mass.	18	0	18	21	16

*Contains 2-cent tax collected by retail dealer and paid by him directly to state.

†While the Atlantic Refining Co. quotes 17c as the tank wagon market at Erie, it is understood sales are still being made at as much as 2 cents under this figure as for the past few weeks, due to local price disturbance.

S. O. KENTUCKY

Lexington, Ky.	16	5	21	24	16
Louisville, Ky.	18	5	23	26	14
Covington, Ky.	18	5	23	26	16
Clarksdale, Miss.	17	3	20	23	14
Jackson, Miss.	17	3	20	23	13
Natchez, Miss.	16.5	3	19.5	22.5	13.5
Vicksburg, Miss.	16.5	3	19.5	22.5	13.5
Birmingham, Ala.	18	2	20	23	16.5
Mobile, Ala.	17	2	19	22	14
Montgomery, Ala*	19	2	21	24	17.5
Atlanta, Ga.	†19	3½	23	26	17
Augusta, Ga.	†19	3½	23	26	16.5
Macon, Ga.	†19	3½	23	26	15.5
Savannah, Ga.	†14	3½	18	21	15
Jacksonville, Fla.	17	4	21	24	15
Miami, Fla.	19	4	23	26	16.5
Tampa, Fla.	17	4	21	24	15
Pensacola, Fla.	17	4	21	24	15.5

*Local privilege tax of 1 cent on gasoline and ½ cent on kerosene at Montgomery included.

†Georgia has ½ cent per gal. inspection fee on gasoline which is deducted as well as the state gasoline road tax of 3½ cents, to get the actual net tank wagon market to dealer.

S. O. INDIANA

	Gasoline T.W.	Tax	Total	S.S.	Oil T.W.
Chicago, Ill.	†17	0	†17	19	12
Decatur, Ill.	17.2	0	17.2	19.2	12.5
E. St. Louis, Ill.	16.1	0	16.1	18.35	11.6
Joliet, Ill.	17.4	0	17.4	19.4	12.7
Peoria, Ill.	17.2	0	17.2	19.2	12.5
Quincy, Ill.	17.2	0	17.2	19.2	12.3
Indianapolis, Ind.	17.2	3	20.2	22.2	12.7
Evansville, Ind.	17	3	20	22	12.5
South Bend, Ind.	17.4	3	20.4	22.4	12.9
Detroit, Mich.	17.8	2	19.8	21.8	13.2
Grand Rapids, Mich.	17.7	2	19.7	21.7	13.1
Saginaw, Mich.	17.9	2	19.9	21.9	13.3
Madison, Wis.	17.3	2	19.3	21.3	12.5
Milwaukee, Wis.	17.1	2	19.1	21.1	12.3
La Crosse, Wis.	18.2	2	20.2	22.2	13.4
Minneapolis, Minn.	18.2	2	20.2	22.2	13.6
Duluth, Minn.	18.5	2	20.5	22.5	13.6
Mankato, Minn.	18.1	2	20.1	22.1	13.4
Des Moines, Iowa.	17.5	2	19.5	21.5	12.9
Davenport, Iowa.	17.5	2	19.5	21.5	12.9
Sioux City, Iowa.	17	2	19	21	12.5
Mason City, Ia.	17.5	2	19.5	21.5	12.9
St. Louis, Mo.	**16.6	2	18.6	20.9	12
Kansas City, Mo.	††17.9	2	19.9	21.9	11.3
St. Joseph, Mo.	**17	2	19	21	11.9
Fargo, N. D.	19.9	1	20.9	22.9	15.6
Grand Forks, N.D.	20.2	1	21.2	23.2	15.9
Minot, N. D.	19.9	1	20.9	22.9	15.6
Pierre, S. D.	15	3	18	*	14.1
Huron, S. D.	16	3	19	21	14.1
Wichita, Kans.	16.3	2	18.3	21.3	11.8
Bartlesville, Okla.	14.4	3	17.4	19.4	10.9

†Dumps of 100 or more gallons at 16c per gallon.
*S. O. Indiana does not operate station.
**Includes city tax of ½c.
††Includes city tax of 1c.

S. O. NEBRASKA

Crawford, Neb.	18	2	20	*	13.25
Omaha, Neb.	16.25	2	18.25	20.25	12.5
McCook	18.75	2	20.75	22.75	14
Norfolk	17.75	2	19.75	21.75	13
North Platte	18.75	2	20.75	22.75	13.75
Scottsbluff	18.25	2	20.25	22.25	13.25

*Standard has no service station here.

CONTINENTAL OIL

Denver, Colo.	18	2	20	22	15.5
Pueblo, Colo.	17	2	19	21	15.5
Casper, Wyo.	18	2½	20.5	22.5	14
Cheyenne, Wyo.	19	2½	21.5	23.5	15.5
Butte, Mont.	20	2	22	22	17
Helena, Mont.	22	2	24	26	18
Salt Lake City, Utah	20	3½	23.5	25.5	18
Boise, Ida.	22	3	25	27	20
Albuquerque, N.M.	21.5	3	24.5	27.5	17.5

S. O. CALIFORNIA

Phoenix, Ariz.	20	3	23	26	21.5
Los Angeles, Cal.	10.5	2	12.5	18.5	15.5
Fresno, Cal.	14.5	2	16.5	20.5	17.5
San Francisco, Cal.	14	2	16	20	15.5
Reno, Nev.	17.5	4	21.5	25.5	19
Portland, Ore.	14	3	17	21	16.5
Seattle, Wash.	14	2	16	20	16.5
Spokane, Wash.	18	2	20	24	20.5
Tacoma, Wash.	14	2	16	20	16.5

S. O. LOUISIANA

Little Rock, Ark.	15	4	19	22	14.5
Alexandria, La.	15	2	17	20	14.5
Baton Rouge, La.	14	2	16	19	13
Lake Charles, La.	15.5	2	17.5	20.5	14.5
New Orleans, La.	*15.5	2	17.5	20.5	13.5
Shreveport, La.	14	2	16	19	13.5
Lafayette, La.	16	2	18	20	14
Bristol, Tenn.	16.5	3	19.5	22.5	15
Chattanooga, Tenn.	15.5	3	18.5	21.5	15
Knoxville, Tenn.	16	3	19	22	15.5
Nashville, Tenn.	15.5	3	18.5	21.5	15
Memphis, Tenn.	15	3	18	21	14.5

*Includes 1c city tax on gasoline and kerosene.

S. O. OHIO

	Gasoline T.W.	Tax	Total	S.S.	Oil T.W.
All Ohio points	19	2	21	23	15

MAGNOLIA PETROLEUM

Muskogee, Okla.	17	3	20	23	10
Oklahoma City	17	3	20	23	12
Tulsa, Okla.	13	3	†16	19	12
Fort Smith, Ark.	15	4	19	22	14.5
Little Rock, Ark.	15	4	19	22	14.5
Texarkana, Ark*	17	4	21	24	13
Dallas, Tex.	15	1	16	20	12
El Paso, Tex.	18	1	19	20	13
Fort Worth, Tex.	14	1	15	17	11
Houston, Tex.	16	1	17	20	12
San Antonio, Tex.	15	1	16	17	11

*Within city of Texarkana, Ark., the state tax on gasoline is 1c per gal. conforming with the Texas state tax. In Texarkana district outside of the city the 4c state tax applies.

†16c to regular power trade. 18c to all other tank wagon consumers.

V. M. & P. NAPHTHA

(Changes ordinarily occur coincident with gasoline)

	Oleum Spirits	V.M.&P. Naphtha	Cleaners Naphtha
Chicago	19	21	21
Detroit	20.2	22.7	22.7
Kansas City	19.2	21.2	21.2
Milwaukee	19.2	23.7*	23.7*
Minneapolis	20.5	25*	25*
St. Louis	18.4	20.9	22.2
New York		18	....

*Including state tax.

CANADA

(Per Imperial Gallon, which is 1.2 American Gallons)

ONTARIO

	Gasoline T.W.	Tax	Total	S.S.	Oil T.W.
Toronto	24.5	3	27.5	31	20
Ottawa	25.5	3	28.5	32	21
Cochrane	29.5	3	32.5	36	24.5
Ft. William	28.5	3	31.5	35	22.5

MANITOBA

Winnipeg	28.5	3	31.5	35	22.5

SASKATCHEWAN

Regina	31.5	0	31.5	35	25.5

ALBERTA

Edmonton	32.5	2	34.5	38	27.5
Calgary	30.5	2	32.5	36	26.5

BRITISH COLUMBIA

Vancouver	22	3	25	29	23

QUEBEC

Montreal	24.5	3	27.5	31	20
Quebec City	26.5	3	29.5	33	22
Three Rivers	26.5	3	29.5	33	22

NEW BRUNSWICK

St. John	27.5	0	27.5	32	25
Moncton	27.5	0	27.5	32	25

NOVA SCOTIA

Halifax	27.5	3	30.5	35	28
Sydney	29.5	3	32.5	33	25

PRINCE EDWARD ISLAND

Charlottetown	27.5	2	29.5	34	28

Note: In districts surrounding these points 1c additional is added to city price.

Complete Export Markets

New York | Gulf Coast | California

Gasoline For Export Strengthening; Gas Oil Firm; Kerosene Steady

By Special Correspondent
NEW YORK, Feb. 22

GASOLINE continued to strengthen along the Atlantic Seaboard although in the Gulf section the market was barely steady with leading independent refiners selling to the domestic trade ¼ cent below export prices in order to meet inland competition. Export demand lagged, although two of the leading factors are working on three mixed cargoes for shipment during March and April.

Gas oil was a shade firmer. Kerosene was steady while the waxes slumped. Lubricating oils marked time. Bunker oil was steady. Heavy Mexican crude was a shade easier.

Export Gasoline—New York

Export inquiries were decidedly more numerous. One of the large Independents is working on a cargo of 45,000 barrels of water white kerosene along with U. S. Motor and 64-66 gravity gasoline for March shipment to the United Kingdom. There was an inquiry from France for 40,000 barrels of U. S. Motor and 64-66 gravity gasoline for March shipment. Most of the local refiners are asking 12½ cents a gallon, for shipment over the next two weeks and 12¾ cents for future shipments.

Others are unwilling to quote beyond 30 days. The trade has been looking for another advance in cased gasoline.

Demand for cased gasoline is better. One of the smaller factors booked an order for 5,000 cases of U. S. Motor and 64-66 gravity for March shipment to the Argentine. Another booked 4,000 cases of U. S. Motor to the Near East.

Export Gasoline—Gulf Ports

One of the leading Independents closed an order for 50,000 barrels of 60-62-400 e. p. at 13¾ cents and 64-66 at 14¾ cents a gallon for March shipment to London. This factor has also practically closed a cargo of 1,500,000 gallons of 61-63 gravity gasoline at 14 cents a gallon for April shipment to France.

Another leading Independent is working on a cargo of 45,000 barrels of U. S. Motor, 64-66 and prime and water white kerosene for March shipment to France. A leading refiner is reported to have closed 40,000 barrels of prime and water white kerosene and 64-66 gravity and U. S. Motor gasoline at around 7 cents for prime, 8 cents for water, 14¾ to 15 cents for 64-66 and 11¾ cents for U. S. Motor.

Demand for cased gasoline is sluggish. One of the leading Independents is working on an inquiry for 30,000 cases for March-April shipment to Australia. This factor is quoting U. S. Motor at $2.25 a case and 64-66 at $2.50 a case. There was an inquiry from South America for 10,000 cases of Motor and 64-66 but this is still pending.

Domestic Gasoline—Gulf Ports

At New Orleans the asking price for U. S. Motor gasoline, in tank cars at the refineries was 11¾ cents a gallon, or ¼ cent below the export price. There has been considerable competition inland which has tended to weaken the market. Jobbing demand is fairly good but some refiners are anxious to move their stocks.

Domestic Gasoline—New York

A Philadelphia refiner is now asking 12¾ cents a gallon for U. S. Motor gasoline while New York refiners are quoting 12½ cents for spot delivery and 12¾ cents for future. California gasoline has not had much effect on the local market the past week, being quoted at 12½ cents laid down here. Jobbing demand for gasoline is more spirited, jobbers being anxious to take advantage of present prices, as the trade is looking for 13-cent gasoline soon. The present price in tank cars delivered to the trade is 13½ cents a gallon.

Export Kerosene—New York

Demand for kerosene for export has been spasmodic and disappointing but the market was firm at all times owing to depleted supplies. Only one big Independent is in a position to offer water white in sizable quantities and this factor advanced the price ½ cent a gallon early in the week, to 9½ cents at the refinery. Demand from abroad has been mainly for very small quantities for immediate requirements.

Cased kerosene was dull but steady. No further price changes have taken place although the market was ripe with rumors of an impending advance. There is a fairly steady contract shipment to the West Coast of Africa and South America. A Chinese buyer was inquiring for 30,000 cases for March shipment but this is pending and will probably be booked by a Gulf refiner.

Export Kerosene—Gulf Ports

Bulk kerosene was steady but quiet. Sales above reported were the only ones heard of during the week. Prime was steady at 7¼ to 7¾ cents and water at 8¼ to 8¾ cents a gallon in cargo lots. There has been a better inquiry for cased kerosene, and exporters are quoting 5 cents above the previous week's prices with water white at $1.75 a case and prime white at $1.65 a case, cargo lots. There was an inquiry from Australia for 35,000 cases for March-April shipment but this is pending. South American and Near Eastern buyers have not been showing much interest lately.

Domestic Kerosene—New York

At New York harbor refineries water white is now held at 9½ cents a gallon and 10½ cents in tank cars delivered to the jobbing trade. Jobbers are showing comparatively little interest, the recent advance being attributed to the small stocks on hand. Buyers feel that prices will advance ½ cent and then decline with the first warm spell, and consequently are buying sparingly. The asking price for standard white at local refineries was well held at 8½ cents a gallon, refinery and 9½ cents, delivered to the trade in tank cars. The tank wagon price was steady at 16 cents a gallon.

Lubricants—Gulf Ports

There was an inquiry in the market from France for 35,000 barrels of assorted lubricants for March shipment, but this failed to materialize. Export demand has been very disappointing and the undertone of the market is easier, although price fluctuations were very narrow. Domestic demand is a shade more active but the majority of foreign buyers are holding off pending developments. There is less interest in zero cold test oils.

Lubricants—New York

Demand for lubricating oils has been unusually slow. The big refiners are shipping fairly large quantities abroad on consignment but export buyers are not showing much interest in developments over here. While most factors were asking 25 to 26 cents a gallon for Pennsylvania 600 s. r. in barrels, New York, 24 cents could have been done in one direction on a firm bid. Paraf-

fin oils were quiet but fairly steady. Neutral oils are dull and unchanged.

Gas Oil—New York

This market was firmer. There was an inquiry from a Continental buyer for a cargo of 28,000 barrels for March shipment, which is still pending. The price for 36-40 gravity was advanced ¼ cent by leading refiners who are now asking 6¼ cents a gallon at the refinery, but 28-34 was unchanged but firm at 5½ cents a gallon. Domestic demand is spasmodic, but there is a heavy contact movement and stocks are somewhat depleted. Cables received from abroad indicate that many of the big European consumers are still purchasing Galician gas oil, being able to lay it down at destinations below United States oil.

Gas Oil—Gulf Ports

A rather wide range of prices prevailed in the Gulf gas oil market as the week closed. Some factors were quoting 32 plus dark gas oil at 4⅝ cents a gallon, intimating that 4½ cents can still be done while others were asking as high as 5¼ cents a gallon. For 26-28 gas oil, transparent through the neck of a four ounce bottle, the price ranged from 4¾ to 5½ cents a gallon. As a rule export buyers are showing little interest. No cargo inquiries or sales were disclosed. Refiners are holding their stocks for spring and summer cracking.

Bunker Oil—New York

Demand for grade C bunker oil was less active last week, the bulk of the movement being against old contracts. Termination of the coal strike has led some observers to look for a softening in this market but refiners state they have considerable business on their books and see no possibility of a reduction. Export business is spasmodic and disappointing. The asking price for grade C is still $1.75 a barrel f. o. b. New York Harbor refinery while the f. a. s. price is $1.81½ New York harbor.

Bunker Oil—Gulf Ports

Demand for grade C bunker oil has been fair and the market price is unchanged at $1.60 a barrel f. o. b. Export buying is light. No cargo offerings are reported except at Tampico where $1.40 a barrel is quoted. The bunkering price at Tampico is still $1.45 a barrel including taxes. Heavy Panuco crude oil is a shade easier with cargo offerings at $1.13 a barrel, f. o. b. Tampico, taxes to be added.

Waxes—New York

Demand for fully refined waxes continued negligible last week. White crude and semi refined grades were also listless. The tendency was a trifle easier although no reductions were announced. There were very few export inquiries, while domestic buying was strictly hand-to-mouth. Cables to European buyers were without result, and Europeans are holding off for lower quotations. The asking price for white crude scale 122-124 A. M. P. was held at 5¼ cents a pound while

New York Export Market

Prices below are an index to the export markets as of the dates given. In many cases they are actual sales prices. So many factors enter into the price in export transactions that an actual market price governing the bulk of transactions cannot be given.

GASOLINE	Feb. 22	Feb. 15
U. S. Motor, Tank cars Ref.	12½-12¾	-12½
U. S. Motor cases	28.15	-28.15
California grade U. S. Motor F. O. B. N. Y. Bulk	12½	-12½
KEROSENE		
41-43-150 W. W. Tank cars Ref.	09½	09
41-43-150 W. W. Cases	19.90	-19.90
42-44-110 S. W. Cases	18.40	-18.40
GAS OIL		
36-40, Bulk Refinery	06¼-06½	06 -06½
28-34, Bulk Ref	05½-06¼	05½-06¼
MEXICAN BUNKER OIL		
Grade C, f. o. b. ref. Bulk	1.75	-1.75
Diesel Oil f. o. b. ref. Bulk	2.20	-2.20

LUBRICATING OILS

The following prices are cooperage basis f. o. b. New York, products being manufactured by inland refineries.

CYLINDER OILS (bbls.) 1 inch Immersion Test; All Penna. Products		
Filtered D 600	32	-32
Filtered E 600	30	-30
Unfiltered 600 s. r.	25	-25
Unfiltered 650 s. r.	30	-30
600 flash s. r.	32	-32
630 Flash	42	-42

RED PARAFFIN (bbls.) (Viscosity at 70)		
300 vis. No. 5 color	21½	-21½
250 vis. No. 5 color	20½	-20½
High Viscosity. No. 5 color	26	-26

Neutral Oils (bbls.) (Viscosity at 70)		
200 vis. at F. Pale. No. 3 color	-31½	-31½
180 Pale. No. 3 color	-29½	-29½
150 Pale. No. 3 color	-24¾	-24¾

BLACK OIL (bbls.)				
25-30 cold test	14	-15	14	-15
15 cold test	15	-15½	15	-15¾

MEDICINAL OILS (Includes Price of Drums) (Penna. Stocks)	Feb. 22	Feb. 15
Domestic.875-.885s.g.	1.00-1.08	1.00-1.08
Domestic.865-.870s.g.	.75- .80	.75- .80
Russian.885-.890s.g.325-330 vis.	1.20-1.25	1.20-1.25

WAXES (Penna. Stocks) (F. A. S. Carload Lots)		
WHITE CRUDE SCALE		
122-124 A. m. p.	-05¼	-05¼
124-126 A. m. p.	-05¼	-05¼
MATCH		
105-108 A. m. p.	-06	-06
FULLY REFINED		
120-122 A. m. p.	06	-06
123-125 A. m. p. Philadelphia	06¼	-06¼
125-127 A. m. p.	06¼	-06¼
128-130 A. m. p.	06¼	-06¼
130-132 A. m. p.	06¾	-06¾
133-135 A. m. p.	06¾	-06¾
135-137 A. m. p.	-07¼	-07¼
SEMI REFINED		
122-124 A. m. p.	-05¼	05¼
YELLOW CRUDE SCALE		
124-126 A. m. p.	05¼	-05¼

PETROLATUMS (Penna. Stocks) Per Pound		
Dark Green	02¼	02¼
Veterinary	03¼	03¼
Light Amber	03½	03½
Dark Amber	03½	03½
Cream	06¾	06¾
Lily White	08½	08¾
Snow White	11 -11½	11 11½

Gulf Export Market

Gasoline
F. O. B. Seaboard
Shipments of 20,000 Bbls. and over

	Feb. 22	Feb. 15
U. S. Motor, Cargo	11¾-.12	11¾ -.12
60-62 400 e. p. Bulk	.18½	.18½
64-66, 385 e. p. Bulk	14¾- 15	14¾ -.15
U. S. Motor, Cases (cargo lots)	2.25	2 40
64-66, Cases (cargo lots)	2.50	2.70
KEROSENE		
Water White, 41-43 bulk	08¼-08¾	-08
Prime White, 42-44 bulk	07¼-07¾	-07
Water White, cases (cargo lots)	1.75	-1.70
Prime White, cases (cargo lots)	1.65	-1.60

DOMESTIC GAS AND BUNKER OIL		
26-28, gravity, bulk*	-05	04¾-05¼
32 plus, bulk, Dark	-04¾	04½-04¾
Grade C, Bunker oil	1.60	-1.60
Cargoes	nominal	nominal

*Transparent through neck of a 4 oz. bottle.

MEXICAN CRUDE AND BUNKER OILS F. O. B. Steamer Tampico		
Heavy, Taxes to be added	1.13	-1.15
Grade C, Bunker oil Taxes paid	1.45	1.45
Grade C. Bunker oil F. A. S. New Orleans	1.60	1.60

Lubricating Oils

SOUTH TEXAS

(Viscosity at 100°F; cold test 0)
(Tanker, F. O. B. Houston)

	Feb. 22	Feb. 15
100 Vis. No. 2 Unfiltered Pale	07	07
150 Vis. No. 2½ Unfiltered Pale	09	09
200 Vis. No. 3 Unfiltered Pale	11	11
300 Vis. No. 3 Unfiltered Pale	13½	13
500 Vis. No. 3½ Unfiltered Pale	15	15
200 Vis. No. 5½ Red Oil	10½	10½
300 Vis. No. 5½ Red Oil	12	12
500 Vis. No. 6 Red Oil	13¾	14
800 Vis. No. 6 Red Oil	18½	18½

Pacific Export Market

Cargo lots quotations at seaboard, Los Angeles)

	Feb. 22	Feb. 15
Gasoline, U. S. Motor— 54°—56°	8 -10	8 -10
Gasoline—U. S. Motor blends and special cuts	9 -10½	9 -10½
Gas Oil, 24°—30°B. per bbl.	$1.15	$1.15
Diesel Oil, 27°B—plus per bbl.	$1.15	$1.15
Bunker Oil, 14°—18°B. per bbl.	$1.00	$1.00
Fuel Oil, 14°—18°B. per bbl.	$1.00	$1.00
Kerosene, W. W. 40°—42° B per gal., 125-150 flash test	05 -05½	05 -05½
Cased Goods		
Gasoline, U. S. Motor	$2.35	$2.35
Kerosene, W. W. 40°—42° B per case, flash test 125-150	$1.40-1.50	$1.40-1.50

N. Y. Domestic Market

The following light oil, gas and fuel oil prices are F. O. B. New York refineries, being products made from Domestic (including California) and Mexican Crudes.

	Feb. 22	Feb. 15
U. S. Motor Gasoline, Tank Cars Delivered greater N.Y.	-13½	-13½
U. S. Motor Gasoline, Tank Cars Bayonne	-12½	-12½
Kerosene, 41-43 150 W. W. Tank Cars Del'd greater N.Y.	-10½	-.10
Grade C Bunker f.o.b. N.Y. Ref.	1.75	1.75
Diesel Oil f.o.b. Refinery	2.20	2.20
Gas Oil, 36-40, Bulk Refinery	-06½	-06
Gas Oil, 28-34 Bulk, Refinery	-05½	-05½

semi refined 122-124 was quoted at 5½ cents. Fully refined was still quoted on a basis of 6⅛ cents for 123-125 A. M. P.

Waxes—Gulf Ports

Very little change took place in the Gulf markets for waxes last week. Fully refined is moving in a small way at 5.90 cents for 125-127 A. m. p. while 128-130 A. m. p. is held at 6 cents and 133-135 A. m. p. at 6⅜ cents. White crude scale 124-126 A. m. p. is held at 5¼ cents while 124-126 semi refined is held at 5⅜ cents a pound. Export buyers are holding off and purchases were strictly confined to immediate requirements.

Crude Exports Decline 25%; Gasoline

WASHINGTON, Feb. 20.—Petroleum exports during 1925 from this country showed only small changes over the totals of 1924, according to the Minerals Division of the Department of Commerce.

The total value of petroleum exports during 1925, not including petrolatum, medicinal oils and similar products, was over $471,000,000, which is 9.6 per cent of the total merchandise exports during the year.

While values of oil shipments increased slightly, quantities shipped abroad declined during 1925. Crude oil shipments decreased 4,479,976 barrels to 13,124,905 barrels in 1925 under 1924, or 25.4 per cent. Crude oil exports to Canada, the principal market, fell off nearly 20 per cent while exports to England, Mexico and Cuba also decreased and practically ceased to Argentina.

Total exports of refined oils increased 15,863,000 gallons in 1925, or .404 per cent, totaling 3,938,131,000 gallons for the year.

Gasoline and lubricating oil exports reached new high levels in 1925. Gasoline shipments abroad totaled 1,290,000,837 gallons, which is an increase of 71,683,527 gallons over 1924, or 5.88 per cent. Lubricating oil exports totaled 403,045,633 gallons, which is an increase of about 21,000,000 gallons, or 6 per cent.

The increase in oil export trade during the past year over 1924 represented a general growth with practically all of the leading markets in Europe, Latin America and the Far East, with few outstanding changes. The report indicates that gasoline and lube oil exports to the United Kingdom, the largest purchaser of these two products from America, declined about 7 per cent the past year, due to the rapidly growing refining industry in England and Scotland. Kerosene exports to England, which is this country's second largest purchaser of this product, China ranking first, showed a larger decrease, amounting to 30 per cent under 1924.

Crude Oil Prices All Fields

ALL PRICES EFFECTIVE, *February 22*

EASTERN FIELDS
Posted by Joseph Seep Purchasing Agency

Penna. Grade Oil in New York Transit Lines (Alleghany, N. Y. District)	$3.90
Bradford District Oil in National Transit Lines (Bradford District)	3.90
Penna. Grade Oil in National Transit Lines (Other Pennsylvania)	3.80
Penna. Grade Oil in Southwest Penna. Pipe Lines (Other Pennsylvania)	3.80
Penna. Grade Oil in Eureka Pipe Lines (West Virginia)	3.75
Penna. Grade Oil in Buckeye Pipe Lines (Macksburg, O. district)	3.65
Keister Grade in National Transit Lines (Butler Co.)	$2.45
Gaines, Tioga Co. (Pa.)	2.95
Cabell Grade in Eureka Pipe Lines (West Virginia)	2.20
Corning Grade in Buckeye Pipe Lines (Ohio)	2.25
*Somerset Medium in Cumberland Pipe Lines (Kentucky)	2.30
*Somerset Light in Cumberland Pipe Lines (Kentucky)	2.45
Ragland Grade in Cumberland Pipe Lines (Kentucky)	1.15

*Somerset oil run prior to Oct. 1, 1923, takes price of 6 cents lower than above quotations.

CENTRAL STATES FIELDS
Posted by Ohio Oil Co.

Wooster	$2.25	Indiana	$2.00	Plymouth	$1.65
Lima	2.23	Princeton	2.12	*Canadian Petrolia	2.68
Waterloo	1.10	Illinois	2.12	*Posted by Imperial Oil, Ltd.	

OKLAHOMA, KANSAS And NORTH TEXAS FIELDS
(Prices of Prairie Oil & Gas Co.)
(Prairie's prices apply in Oklahoma, Kansas, North and Central Texas.)

28-28.9	$1.40	41-41.9	$2.44
29-29.9	1.48	42-42.9	2.52
30-30.9	1.56	43-43.9	2.60
31-31.9	1.64	44-44.9	2.68
32-32.9	1.72	45-45.9	2.76
33-33.9	1.80	46-46.9	2.84
34-34.9	1.88	47-47.9	2.92
35-35.9	1.96	48-48.9	3.00
36-36.9	2.04	49-49.9	3.08
37-37.9	2.12	50-50.9	3.16
38-38.9	2.20	51-51.9	3.24
39-39.9	2.28	52 and above	3.32
40-40.9	2.36		

Humble Oil & Refining Co. Prices

(Ranger, North Texas, Mexia, Powell, Richland, Wortham, Lytton Springs, Currie and Moran crudes all in Texas.)

Effective Feb. 1, Humble posted same gravity and price schedule as that posted by Prairie, excepting that Humble is paying 8c less for each full degree below 28 gravity.

Magnolia Petroleum Co. Prices
In Oklahoma, Kansas and North Texas

Effective Feb. 1, Magnolia posted same gravity and price schedule as Prairie, in all fields where it purchases on a gravity basis, excepting that it is paying $1.20 for all oil below 28 gravity.

Effective Feb. 1, Corsicana heavy was advanced to $1.15 per barrel.

NORTH LOUISIANA—ARKANSAS FIELDS
***Prices of the Standard Oil Co. of Louisiana**

Caddo, below 32	$1.85	Haynesville, below 33	$1.75	Smackover, 24-24.9	$1.25
do 32-34.9	2.00	do 33 and above	1.85	do 25-25.9	1.30
do 35-37.9	2.10	El Dorado, below 33	1.75	do 26-26.9	1.35
do 38 and above	2.20	do 33 and above	1.85	do 27 and above	1.40
Homer, below 31	1.60	Bull Bayou, 32-34.9	1.70	De Soto	2.05
do 31-32.9	1.75	do 35-37.9	1.85	Crichton	1.85
do 33-34.9	1.85	do 38 and above	2.00	Bellevue	1.65
do 35 and above	1.95	Smackover, below 24	1.00	Cotton Valley	1.10

*Same prices maintained by The Texas Co., Gulf Refining Co. of Louisiana and Louisiana Oil Refining Corp. All purchases of Smackover have maintained since Feb. 1 and 2, the same gravity and price schedule as Standard Gulf is paying 95c for Calion (East El Dorado Crude.)

STEPHENS, ARKANSAS
Posted by Louisiana Oil Refining Corp., and Atlantic Oil Producing Co.

26 and above	$1.50	Below 26	$1.30

GULF COASTAL FIELDS
(Posted by Humble Oil & Refining Co., The Texas Co., Gulf Production Co., Sun Oil Co. and Sinclair Crude Oil Purchasing Co.)

Grades A	$1.50	Grades B	$1.25

Goose Creek, Hull, Orange and Pierce Junction are the only Gulf Coastal fields that have A and B grade classifications. All other fields are classified as A grades only.

ROCKY MOUNTAIN FIELDS
Prices of Ohio Oil Co. and Midwest Refining Co.

†Salt Creek 29-29.9	$1.48	36-36.9	$2.04	Rock Creek	$2.00
30-30.9	1.56	37 and above	2.12	†Osage	2.15
31-31.9	1.64	Elk Basin	2.15	†Cat Creek, Mont.	2.15
32-32.9	1.72	Grass Creek light	2.15	Sunburst, Mont.	1.15
33-33.9	1.80	Big Muddy	2.00	†Hogback, N. Mex.	2.20
34-34.9	1.88	Lance Creek	2.15	Artesia, N. Mex.	1.70
35-35.9	1.96				

†Posted by Midwest Refining Co. Midwest also buys Grass Creek light, and Elk Basin. The Texas Co. buys Salt Creek crude.

CALIFORNIA
Prices of Standard Oil Co of California

Standard Oil Co. of California on Sept. 22 reduced California crude from 10 to 35 cents per barrel and posted 19 new price classifications in the various fields. Instead of paying the same price for the same gravity of oil in all fields regardless of the value of the oil, as it previously has done, the Standard put into effect a new schedule which provides a different schedule of prices for each field and takes into account the varying values of oils of the same gravity in the different fields.

On Oct. 27, it further reduced heavy oils in amounts ranging up to 15 cents. New base price for heavy oils in the San Joaquin Valley is 75 cents, in Southern California fields, 85 cents, and in the Rosecrans-Domingues, Santa Maria and Ventura county fields, it is $1 per barrel for 14 to 14.9 gravity. Light oils remain unchanged.

The complete schedule of prices in California can be obtained from the editorial department of National Petroleum News on application.

REFINERS' and COMPOUNDERS' SUPPLIES

Following are the average market prices for the week on materials used by refiners and compounders f. o. b. shipping point as effective this date.

Refiners' Supplies

	Feb. 22	Feb. 15
Soda Ash light 58% bags cwt.	-$1.38	-$1.38
Silicate of Soda 60 deg. drums.....cwt.	- 1.70	- 1.70
Sal Soda wks.....cwt.	1.10- 1.25	1.10- 1.25
Caustic Soda 70% solid..cwt.	- 3.10	- 3.10
Chloride of Lime.....cwt. works.....	-2.00	- 2.00
Sulphuric Acid 60 deg. tank cars f. o. b. shipping point .....per ton	-10.00	-10.00
Liquid Chlorine tank cars works lb.....	-.04	-.04

Compounders' Supplies (Open Market)

Vegetable Oils—		
Linseed carloads spot.....lb.	11.3	11.3
February.....	11.3	11.3
Tanks, spot.....	10.5	10.5
Boiled carloads spot.....lb.	11.4	11.4
*Soya Bean spot, Bbls....lb.	13½	13½
Animal Oils—		
English Degras.....lb.	.05½	-.05½
Domestic Degras, bbls., carloads.....lb.	-.04¼	-.04¼
*Horse.....lb.	-.10	-.10
Oleic Acid—		
Dist. Bbls.....lb.	.10¾-.11¼	.10¾-.11¼
Saponified Bbls.....lb.	.11¼-.11¾	.11¼-.11¾
Castor Oil—		
No. 1 Carlots, Bbls.....	-.14	-.14
No. 3 Carlots, Bbls.....	-.13½	-.13½
Lard Oils—		
Prime		
Winter Strained. to 1½ffa.40‡45c.t.lb	.17½	.17½
Extra		
Winter Strained. 2 to 4½ffa.40/45c.t.lb.	.15	.15
Extra..... 4 to 5 ffa.40/45c.t.lb.	.14½	.14½
Extra No. 1 7 to 10 ffa.40/50c.t.lb.	.13¾	.14
No. 1.....13 to 18 ffa.40/45c.t.lb.	.13¼	.13¼
No. 2.....22 to 23 ffa.40/45c.t.lb.	.13	.13¼
Prime Edible Tallow under 1¾ffa. 40/45c.t.N.Y.....lb.	-.10¼	-.10½
Tallow acidless.....lb.	-.12¾	-.12¾
Lard Stearine.....lb.	-.17¾	.18-.18½
Oleo Stearine.....lb.	-.11½	-.11¾
Neatsfoot Oil—		
Pure.....bbls.-lb.		.17¾ .17¾
Extra.....do lb.		.15¾ .15¾
No. 1.....bbls.-lb.		.13¼ .13¼
Cold pressed.....lb.		.22¾ .22¾
Fish Oils—		
Menhaden Oil		
Light pressed.....gal.	-.70	-.70
White.....gal.	-.73	-.73
Yellow bleached.....gal.	-.75	-.75
*Herring tank cars coast.....gal.	-.80	-.80
Whale, extra winter bleached.....gal.	-.82	-.82
Seal.....gal.		Nominal
Naval Stores—		
Turpentine, N. Y.....gal.	.96½	1.01
Turpentine†.....gal.	.90	.95
Rosin, B. N. Y.....Bbl.	13.40	13.40
Rosin, F. N. Y.....Bbl.	14.50	14.50
Rosin, B†.....Bbl.	11.90	11.90
Rosin, F†.....Bbl.	13.00	13.00
Rosin Oil 1st run.....gal.	.68½	.70
Rosin Oil 2nd run.....gal.	.73½	.75
Pine Tar—		
Kiln Burnt.....Bbl.	15.00	15.50
Retort.....Bbl.	16.00	15.50
Alcohol—Denatured		
Formula 5		
Bbls.....gal.	-34	-45
Drums.....gal.	-33	-35½

†Savannah, Ga. market.
*Nominal.

Chlorine Demand Gains, Caustic Soda Dull

By Special Correspondent

NEW YORK, Feb. 22.—Following is a review of the markets for oils and supplies used in compounding and refining:

ALCOHOL weak. Buying spasmodic and mainly for actual needs. Resale offerings plentiful. Big buyers well supplied. No further reductions announced.

ANIMAL OILS steady. Demand routine and prices well held, with exception oleo stearine off ¼ cent. Demand lagging, sellers offering 11¾ cents, in tank cars. Pure neatsfoot oil in better demand. Prime lard oil orders more numerous. Tallow oil buying fair. Oleic acid dull but steady.

CAUSTIC SODA demand less spirited. Buying mainly hand-to-mouth. Prices softer. Stocks accumulating.

FISH OILS steady but dull. Crude menhaden oil in tank cars at the factory 52½ to 55 cents a gallon. Light pressed menhaden oil demands more active at 70 cents a gallon, in barrels. Domestic cod oil movement slightly large. Whale oil lagging.

LINSEED OIL generally dull and easy. Flaxseed movement downward. Oil buyers holding off pending reduction in prices. Paint makers expected to enter market latter part of month. Soya bean oil quiet—unchanged.

NAVAL STORES dull. Demand for spirits of turpentine not up to expectations. Southern markets dull. Paint trade buying sparingly. Rosin movement smaller. Price trend irregular. Tar and pitch marking time.

LIQUID CHLORINE demand more spirited. Stocks moderate. Production gaining. Makers asking 7 cents a pound, in cylinder, and 4 cents a pound in tank cars at the works.

SODA ASH dull. Demand spasmodic and big buyers operating hand-to-mouth. Export demand slightly better.

SAL SODA marking time. Stocks fair but buyers reluctant to purchase beyond actual needs.

Spreads in California Lube Prices Narrow

LOS ANGELES, Feb. 22.—There was a tightening in the spread of new lubricating oil prices this week. In all grades selling below 15 cents there is not more than ½ cent difference between the high and low prices. Also there is some price cutting under the new schedule but not to any marked extent.

The spread in the price of crude scale wax tightened about ¼ cent. The present price range is from 6 to 6¼ cents.

Heaviest rains of the season lasting for several days throughout California have materially reduced gasoline consumption.

Exports and east coast shipments of gasoline continued to move in normal volume. Shipments of fuel oil are good, most of them consigned to Pacific coast ports.

Root Installing New Dubbs Unit

TULSA, Feb. 23.—The Root Refineries, Inc., is installing an additional unit of the Dubbs cracking process at its plant at El Dorado, Ark. The unit is of the new large type capable of handling 1000 barrels of cracking stock per day.

Standard Builds Gathering Lines for Urania

SHREVEPORT, Feb. 22.—Standard Pipeline Co., Inc., affiliated with the Standard Oil Co. of Louisiana, is making plans for a gathering system and loading racks to handle crude oil produced in the Urania district. The Standard is now buying for its Baton Rouge refinery all this crude that is being loaded out of the field by the Louisiana Oil Refining Corp., and will extend its purchases.

Average daily production of the Urania field is about 1300 barrels, not including the No. 3 Tullos well of the Natural Gas & Petroleum Corp., which showed for about 2500 barrels daily before sanding up. Nearly all the large wells in the Urania field, La Salle parish, have sanded up shortly after their completion; making maximum daily yields of a few hundred barrels when recompleted.

Benzol Holds Up

NEW YORK, Feb. 22.—Leading marketers of motor benzol are no longer offering spot goods in tank cars at the ovens at 23 cents a gallon. As a result of the advance in gasoline tank wagon prices, motor benzol is now held at 24 cents a gallon. Production of coke is expected to decline steadily now that the coal strike is over, and consequently benzol marketers look for a drop in the benzol production, and a tightening in the supply situation.

Demand for motor benzol has shown a marked improvement with big motor fuel mixture manufacturers anxious to cover their summer requirements as soon as possible. The export inquiry is active but few of the marketers are offering for export at present.

South West Penn Lines Improve Earnings

CLEVELAND, Feb. 22.—Improvement in earnings in 1925 is reported by the South West Pennsylvania Pipe Lines. The Cumberland Pipe Line Co. reports for 1925 lower net profits than in 1924.

The South West lines netted $135,367 on its 1925 operations and received $65,530 in interest on investments and rentals, a total of $200,907. The 1924 total was $91,200. The company wrote off $101,628 in adjusting accounts which, with dividends amounting to $140,000, resulted in a deduction of $40,722 from the surplus account. Of the dividends $35,000 came from earnings previous to 1913, President Forrest M. Towl stated in his report to stockholders. Net earnings were equivalent to $5.74 a share on the $100 stock as compared with $2.60 a share in 1924.

"In making the settlement with the United States income tax bureau for taxes prior to 1925," Mr. Towl said, "the oil purchase and sales contingent account was abolished and adjustments were made decreasing the profit and loss account and increasing the depreciation account and accounts receivable."

Cumberland netted $236,590 on the year's operations and received $130,961 in interest and rentals, a total of $367,551 as compared with a total of $439,446 in 1924. The 1925 profits were equivalent to $12.25 per $100 share as compared with $14.64 per share in 1924. Dividends in 1925 amounted to $360,000, leaving a balance of $7,551 to surplus. Other additions to surplus were: $82,286 adjustment of previous years' accounts; $64,180 profit on sales of securities purchased in previous years, and $61,762 adjustment of profit and loss suspense account.

Comments of Mr. Towl on the Eureka and Southern Pipe Line companies were published in National Petroleum News for Feb. 10.

Humble Proposes Increase In Capital Stock

HOUSTON, Feb. 22.—Stockholders of the Humble Oil & Refining Co. were advised Feb. 8 that directors believed expansion of the company made it advisable to increase the capital stock from 1,750,000 to 3,000,000 shares of $25 par value each. The annual meeting of the stockholders was to have been held Feb. 8 but was postponed until March 1, when the proposed stock increase will be voted on.

If the stock increase is approved probably 83,333 shares will be set aside for purchase by employes and stockholders of record March 1 will be granted right to subscribe to two additional shares of stock for each three shares held on that date. Stockholders would get the additional stock at par and employes at a price to be set by the board of directors.

Income Accounts of Cumberland Pipe Line Co.

	1925	1924	1923	1922	1921
Profits	$ 367,551	$ 439,446	$ 786,420	$ 723,605	$ 301,013
Dividends	360,000	360,000	300,000	180,000	180,000
Surplus	$ 7,551	$ 79,446	$ 486,420	$ 543,605	$ 121,013

Balance Sheets of Cumberland Pipe Line Co. as of Dec. 31

	1925	1924	1923	1922	1921
ASSETS					
Plant	$4,659,709	$4,626,729	$4,638,577	$4,362,484	$4,245,687
Other Investments	2,660,470	2,885,637	2,227,762	1,880,262	909,682
Accounts Receivable	167,081	165,721	153,478	138,017	105,270
Cash	310,966	63,610	289,599	167,330	348,197
Total	$7,798,226	$7,741,697	$7,309,416	$6,548,093	$5,608,836
LIABILITIES					
Capital Stock	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$1,500,000
Depreciation	2,791,495	2,346,613	2,162,228	1,926,336	1,565,133
Accounts Payable	456,546	145,716	23,869	12,029	85,045
Oil Purchase, Sales Contingent	.....	.....	.....	841,190	733,725
Surplus	1,550,185	1,334,405	1,254,958	768,538	1,724,933
Total	$7,798,226	$7,741,697	$7,309,416	$6,548,093	$5,608,836

Income Accounts of South West Pennsylvania Pipe Lines

	1925	1924	1923	1922	1921
Profit	$ 200,907	$ 91,200	$ 268,464	$ 315,871	$ 161,970
Dividends	140,000	245,000	279,999	245,000	210,000
Surplus	$ 60,907	*$ 153,800	*$ 11,535	$ 70,871	*$ 48,030

*Deficit.

Balance Sheets of South West Pennsylvania Pipe Lines as of Dec. 31

	1925	1924	1923	1922	1921
ASSETS					
Plant	$4,205,417	$4,222,912	$4,163,670	$4,140,779	$4,142,682
Other Investments	1,500,766	1,338,391	1,338,391	1,398,391	1,236,891
Accounts Receivable	394,231	168,941	234,138	298,211	296,447
Oil Purchase Sales Contingent	.....	16,696	17,399	9,986	.....
Cash	86,104	41,773	140,507	94,214	28,634
Total	$6,186,518	$5,788,713	$5,894,105	$5,881,581	$5,704,654
LIABILITIES					
Capital Stock	$3,500,000	$3,500,000	$3,500,000	$3,500,000	$3,500,000
Depreciation	2,066,738	1,599,195	1,494,818	1,385,603	1,285,756
Accounts Payable	52,924	81,940	137,909	223,064	214,588
Oil Purchase Sales Contingent	.....	.....	.....	.....	2,267
Surplus	566,856	607,578	761,378	772,914	702,043
Total	$6,186,518	$5,788,713	$5,894,105	$5,881,581	$5,704,654

Income Accounts of Eureka Pipe Line Co. for Last Five Years

	1925	1924	1923	1922	1921
Loss	$ 208,353 †$	32,061 †$	324,507 †$	632,603 †$	426,339
Dividends	200,000	350,000	555,001	400,001	500,001
Deficit	$ 408,353	$ 317,939	$ 225,493	$* 232,602	$ 73,662

*Surplus †Profits

Balance Sheets of Eureka Pipe Line Co. as of Dec. 31

	1925	1924	1923	1922	1921
ASSETS					
Plant	$10,822,533	$10,808,291	$10,793,194	$10,813,420	$10,792,496
Other Investments	2,205,019	1,945,035	1,945,035	1,895,160	1,167,610
Accounts Receivable	256,903	180,400	238,719	251,302	260,241
Oil Purchase, Sales Contingent	.....	208,616	202,416	190,243	99,855
Cash	277,006	316,998	429,554	346,612	591,205
Total	$13,561,461	$13,459,340	$13,608,918	$13,496,737	$12,911,407
LIABILITIES					
Capital Stock	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 5,000,000
Depreciation	5,488,759	4,925,395	4,672,151	4,322,616	3,933,511
Accounts Payable	245,516	298,406	383,289	395,150	431,527
Surplus	2,827,186	3,235,539	3,553,478	3,778,971	3,546,369
Total	$13,561,461	$13,459,340	$13,608,918	$13,496,737	$12,911,407

Income Accounts of Southern Pipe Line Co. for Last Five Years

	1925	1924	1923	1922	1921
Profits	$ 191,266	$ 280,092	$ 547,707	$ 982,239	$ 1,090,996
Dividends	400,000	800,000	999,999	799,999	1,000,001
Deficit	$ 208,734	$ 519,908	$ 452,292	$* 182,240	$* 90,995

*Surplus

Balance Sheets of Southern Pipe Line Co. as of Dec. 31

	1925	1924	1923	1922	1921
ASSETS					
Plant	$ 5,969,671	$ 5,971,232	$ 5,970,849	$ 5,966,988	$ 5,974,155
Other Investments	7,524,983	7,572,531	7,762,571	7,771,217	7,441,671
Accounts Receivable	120,146	133,871	206,659	297,069	222,342
Cash	51,676	26,121	110,723	340,079	577,753
Total	$13,666,476	$13,703,755	$94,050,802	$14,375,353	$14,215,921
LIABILITIES					
Capital Stock	$10,000,000	$10,000,000	$10,000,000	$10,000,000	$10,000,000
Depreciation	2,677,886	2,505,898	2,333,088	2,162,946	1,990,660
Accounts Payable	418	951	901	43,302	238,386
Surplus	988,172	1,196,906	1,716,803	2,169,105	1,986,866
Total	$13,666,476	$13,703,755	$94,050,802	$14,375,353	$14,215,921

Transactions In Oil Shares on New York Stock Exchange

1925 High	1925 Low	1926 High	1926 Low		Listed Capital	Par Value	Stocks	Div. Rate	Last Paid	Transactions week ended Feb. 20 Sales	First	High	Low	Last	Ch'ge
79¾	48	74	69	(sh)	200,000	N.P.	American Republics	.....	.....	.....	.....	.....	.....	.....	.....
47¼	32	59⅛	44¾	$	56,000,000	$25	Associated Oil	50cQ	Jan. 25, 26	48,500	58½	58¾	58¼	58½	— ⅜
117½	95½	110	104⅛		50,000,000	100	Atlantic Refining	.....	June 16, 24	2,800	107	107	104⅛	106	— ⅜
117¾	113½	117	116½		20,000,000	100	do pfd	$1¾Q	Feb. 1, 25	100	116½	116½	116½	116½	0
33½	18¾	33½	29⅝		18,428,350	25	Barnsdall Corp. A	50cQ	Jan. 2, 26	26,600	30⅜	30½	29⅜	29¾	— ¾
30	16	29½	25⅝		3,713,275	25	do B	50cQ	Jan. 2, 26	800	26½	26½	26¼	26½	— ½
2⅜	¼	⅞	¼	(sh)	150,000	N.P.	Caddo Central	.....	.....	1,400	⅝	⅝	½	½	0
34⅜	23⅞	38⅜	30¾	$	44,923,000	$25	California Petroleum	50cQ	Mar. 1, 26	62,000	36½	36½	x34⅝	35	—1⅛
70	42½	73	62⅝		19,834,300	100	General Asphalt	.....	.....	14,400	65½	65¾	62⅝	63⅞	—1⅜
109	86½	113¾	103½		7,416,000	100	do pfd	$1½Q	Mar. 1, 26	500	106	106	104¾	104¾	—3¼
59⅛	42	59½	54½		29,223,650	25	General Petroleum	75cQ	Dec. 15, 25	35,800	55¾	56¼	x54½	55½	—1
85	59	72	64		25,000,000	100	Houston Oil	.....	.....	2,200	67	67	65	65¾	—1¾
41¾	13½	34	24½	(sh)	500,000	N.P.	Independent Oil & Gas	25cQ	Jan. 11, 26	16,700	30	30	28⅛	28¼	—2⅛
14¼	5½	13¾	9½	$	3,204,590	$10	Indian Refining	.....	Dec. 15, 20	4,800	13¼	13¼	11½	12½	— ¾
12⅝	6	12½	9½		4,545,860	10	do ctfs	.....	.....	3,000	12⅜	12⅜	11½	11½	—1
110	77	104	104		2,296,400	100	do pfd	.....	Dec. 15, 21	.....	.....	.....	.....	.....	.....
1½	¼	¾	½		1,678,760	10	Kansas & Gulf	.....	.....	200	½	½	½	½	0
23¾	13⅜	19⅝	16	(sh)	1,121,530	N.P.	Louisiana Oil	.....	.....	16,800	16⅞	17	16	16¾	— ¼
35½	20⅜	28⅞	24⅛	(sh)	330,000	N.P.	Maracaibo Oil	.....	.....	1,500	25¾	26	24¼	24¾	— ½
60½	32⅝	60¼	55	(sh)	1,894,518	N.P.	Marland Oil Co	$1Q	Dec. 31, 25	70,600	58⅞	59⅜	57⅛	58½	— ½
250	225	.....	.....	$	45,942,800	$100	Mexican Petroleum	$3Q	Jan. 20, 26	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....		12,000,000	100	do pfd	$2Q	Jan. 20, 26	.....	.....	.....	.....	.....	.....
22½	29	12⅛	9¾	(sh)	945,939	N.P.	Mexican Seaboard	.....	Nov. 15, 24	6,800	9⅞	9⅞	9¼	9½	— ½
38	25¾	37	33	(sh)	1,357,800	N.P.	Mid-Continent Petroleum	.....	Aug. 1, 23	15,300	34⅞	34⅞	x33½	34⅛	— ⅜
94¼	83	97	94	$	6,718,000	$100	do pfd	$1¾Q	Mar. 1, 26	500	96¾	97	96⅜	97	+2½
3¼	⅜	2½	1¾		26,013,760	10	Middle States	.....	July 1, 23	14,100	1⅝	1¾	1½	1⅝	0
1½	1½	1⅛	⅞		3,786,460	...	do ctfs	.....	.....	100	1	1	1	1	0
78½	51⅝	88¼	74½	(sh)	3,500,000	N.P.	Pacific Oil	$1.50S.A.	Jan. 20, 26	69,400	83⅛	83⅛	81	82¼	— ⅞
83⅞	59½	76½	65¼	$	48,307,400	$50	Pan American P. & T	$1.50Q	Jan. 20, 26	2,800	67	67	65¼	65¼	—3
84½	60⅜	78⅜	66		90,484,800	50	do B	$1.50Q	Jan. 20, 26	39,700	69⅛	69⅜	66	67	—2⅛
49¾	37¼	46	40⅝	(sh)	400,000	N.P.	Pan American Western B	50cQ	Jan. 30, 26	5,900	42⅜	42⅜	41	41	—1½
6¼	2¼	11⅜	4½	(sh)	198,770	N.P.	Panhandle P. & R	.....	.....	15,700	9⅛	11⅜	8⅜	10⅝	+1½
60½	37	85	51	$	2,935,200	$100	do pfd	.....	July 2, 23	2,800	75⅛	85	75⅛	85	+10
47⅞	36¼	48⅝	42¾	(sh)	2,045,381	N.P.	Phillips Petroleum	75cQ	Jan. 2, 26	110,700	47⅜	48⅜	45⅞	47	—1
3½	1¼	1⅞	1⅜	$	29,622,925	$25	Pierce Oil Corp	.....	.....	2,400	1¾	1¾	1½	1¾	+ ⅜
40	20½	27⅜	24		15,000,000	100	do pfd	.....	Feb. 1, 22	700	26	26	25	25	—1
8¼	4½	7	5	(sh)	2,500,000	N.P.	Pierce Petroleum	.....	.....	5,700	6⅛	6⅛	5¾	5⅞	— ¼
32⅝	12½	17½	14¼	$	11,467,850	$50	Producers & Refiners	.....	Sept. 15, 23	2,200	15¼	15¼	14⅜	15	— ½
47⅜	27	35	32¼		2,845,350	50	do pfd	.....	May 1, 25	100	34½	34½	34½	34½	— ⅜
33¾	25⅛	31	28⅜		75,959,250	25	Pure Oil Co	$7½cQ	Mar. 1, 26	15,300	29¼	29¾	28⅝	28⅝	— ⅜
108½	103	109	107		13,000,000	100	do 8% pfd	$8Q	Oct. 1, 25	100	109	109	108⅞	108⅞	— ⅛
57⅜	48¼	57⅜	52⅞	(sh)	773,883	13.40	Royal Dutch, N. Y. shares	$1.33Q	Jan. 29, 26	5,500	53½	54¼	53⅛	53⅞	+ ¼
49	39½	48⅝	45⅝	(sh)	93,599	£2	Shell Transport & T	96½c	Jan. 22, 26	.....	.....	.....	.....	.....	.....
28⅜	21⅝	28⅛	25⅝	(sh)	10,000,000	N.P.	Shell Union Oil	35cQ	Dec. 31, 25	15,900	27¾	27¾	26¼	26½	—1
106½	99½	106½	103½	$	20,000,000	$100	do pfd	$1½Q	Feb. 15, 26	300	104⅜	104¾	104⅜	104¾	+ ¼
28½	17¾	28⅜	23¾		7,207,620	10	Simms Petroleum	50cS.A.	Jan. 2, 26	17,700	27	27½	26	26	—1⅜
24⅞	17	24⅝	20½	(sh)	4,489,320	N.P.	Sinclair Consolidated	.....	May 31, 24	96,300	24	24⅝	23	24⅜	+ ⅜
94⅛	78¾	95	91	$	17,852,200	$100	do pfd	$2Q	Feb. 15, 26	1,900	94¾	95	93¾	95	0
32½	21¾	32⅞	29½		23,024,590	25	Skelly Oil Co	50cQ	Dec. 15, 25	10,700	31¾	31¾	x30⅛	31	— ¾
67¼	51½	62¼	55⅛		237,610,350	25	S. O. California	50cQ	Dec. 15, 25	32,300	59⅜	59⅜	57¼	57⅞	—1⅜
47½	38⅜	46⅜	43⅛		513,456,025	25	S. O. New Jersey	25cQ	Dec. 15, 25	27,800	44⅝	44¾	43¾	44⅛	— ½
119	116¼	118¼	116¾		199,972,900	100	do pfd	$1¾Q	Dec. 15, 25	2,400	118	118¼	117¾	118	+ ¼
43⅞	38⅛	41⅝	36½	(sh)	1,103,776	N.P.	Sun Oil	25cQ	Dec. 15, 25	1,000	38½	38½	37½	37⅝	—1⅜
6⅛	2	4¼	3	(sh)	1,121,368	N.P.	Superior Oil Corp	.....	Dec. 20, 20	2,300	3⅜	3⅜	3	3⅛	— ¼
55	42¾	54	50¾	$	164,450,000	$25	The Texas Co	75cQ	Dec. 31, 25	28,900	53	53	51¾	52	— ½
23⅜	10⅜	19½	15⅝		8,380,340	10	Texas Pacific Coal & Oil	.....	June 30, 23	12,400	16¾	16¾	15⅜	15¾	—1
36⅞	30¼	39¼	34¼	(sh)	2,018,231	N.P.	Tide Water Oil Co	25cQ	Dec. 31, 25	44,600	36¼	38⅜	35½	37⅝	+1⅜
101	99	103	97	$	25,042,000	$100	do 5% pfd	$1.25Q	Feb. 15, 26	6,000	97	101⅞	97	101⅜	+2⅝
5⅞	3½	4¾	4	(sh)	3,742,029	N.P.	Transcontinental Oil	.....	.....	17,600	4⅛	4⅜	4	4	— ⅛
43⅜	33	46	37½	$	40,480,800	$25	Union Oil of California	50cQ	Feb. 10, 26	31,700	42	43½	40⅜	43½	+ ½
134	96¼	94	80		24,423,300	100	Union Tank Car Co	$1¼Q	Mar. 1, 26	400	90	90	89¼	90	+1
117⅛	113¼	116½	114⅝		12,000,000	100	do pfd	$1¾Q	Mar. 1, 25	.....	.....	.....	.....	.....	.....
31¾	25½	29¾	26¼	(sh)	490,000	N.P.	White Eagle Oil & Refining	50cQ	Jan. 20, 26	6,300	29	29	28	28½	— ⅜

*New High †New Low xEx-dividend Total Sales 981,000

Standard Oil Stock Traded In New York Curb Market

1925 High	1925 Low	1926 High	1926 Low		Outstanding Capital	Par Value	Stocks	Div. Rate	Last Paid	Transactions week ended Feb. 19 Sales	First	High	Low	Last	Ch'ge
26⅝	17¼	19¾	17⅜	£	4,000,000	£1	Anglo American	$2.4cS.A.	Jan. 4, 26	1,700	18	18	17⅜	18	0
4¼	1⅜	2¼	2	(sh)	500,000	N.P.	Atlantic Lobos	.....	.....	200	1	2¼	2	2	0
12⅜	3	4¾	3¾	$	10,000,000	$10	do pfd	.....	.....	900	4	4⅜	4	4⅜	+ ⅜
240	205	232	226		1,000,000	100	Borne Scrymser	‡84S.A.	Oct. 15, 25	60	228	231	228	231	+1½
72	53½	59½	55¾		10,000,000	50	Buckeye Pipe Line	$1Q	Feb. 1, 26	200	58½	58½	x58	58	0
74	48½	72½	65		3,000,000	25	Chesebrough Mfg	62½cQ	Dec. 29, 25	1,200	69⅜	72½	69	71⅞	+1⅞
115	110	.....	.....		1,000,000	100	do pfd	$1¾Q	Dec. 31, 26	.....	.....	.....	.....	.....	.....
31½	21⅞	25⅞	22¾		34,914,280	10	Continental Oil	25cQ	Dec. 15, 25	25,900	23½	23⅝	22¾	23	— ⅛
17½	10	16	15½		1,500,000	25	Crescent Pipe Line	.....	Sept. 15, 23	.....	.....	.....	.....	.....	.....
156	132	137	132		3,000,000	100	Cumberland Pipe Line	$3Q	Dec. 15, 25	100	134½	136	133½	136	0
96	61	63¾	59		5,000,000	100	Eureka Pipe Line	$1Q	Feb. 1, 26	50	59	59	59	59	0
68½	23½	32½	27		16,000,000	100	Galena Signal Oil	.....	June 30, 25	675	30	30	27	27	+ ¾
105	88	94½	86		4,000,000	100	do new pfd	$2Q	Dec. 31, 25	70	89¾	89¾	86	87	—1
114	95	97½	92½		2,000,000	100	do old pfd	$2Q	Dec. 31, 25	20	92½	94	92½	94	+1
95	42¼	99⅝	87¾		43,750,000	25	Humble Oil & Refining	30cQ	Jan. 1, 26	12,200	93	93¾	89½	91½	—1½
154½	127	142	134¾		20,000,000	100	Illinois Pipe Line	$6S.A.	Dec. 31, 25	150	137	137	134¾	135½	—1⅞
39¼	27½	38¾	35½	(sh)	6,491,852	N.P.	Imperial of Canada (new)	25cQ	Mar. 1, 26	10,800	36¾	36¾	x35½	36¼	— ⅜
84	57⅞	65½	58	$	5,000,000	50	Indiana Pipe Line	$1Q	Feb. 15, 26	300	65½	65½	64	64	—1
35⅜	22⅝	35¼	32⅛	(sh)	7,118,138	N.P.	International Petroleum	25c	Feb. 15, 26	24,500	34	34¼	32¾	34	0
25⅜	16½	20⅝	18	$	6,362,500	$12½	National Transit	25cS.A.	Dec. 15, 26	300	19	19	19	19	— ½
79	49¼	50	39		5,000,000	100	New York Transit	75cQ	Jan. 15, 26	100	42	42½	42	42½	— ½
88	67½	80½	70¾		4,000,000	100	Northern Pipe Line	$3S.A.	Jan. 1, 26	200	78½	78½	77	77	—1
75¼	60¼	67⅜	61¼		60,000,000	25	Ohio Oil Co	50cQ	Dec. 31, 25	1,700	65¼	65¼	63	64⅛	— ⅛
44½	19	23	16¼		10,000,000	25	Penn Mex Fuel	50c	May 21, 25	600	19	19	19	19	— ½
65½	43⅞	60¼	55		60,000,000	25	Prairie Oil & Gas	.....	July 31, 25	7,700	58	58	56	57⅛	— ⅜
129¾	106	127	123¼		81,000,000	100	Prairie Pipe Line	$2Q	Jan. 30, 26	705	126	126	124½	125½	— ½
254	200	212	202		4,000,000	100	Solar Refining Co	$5S.A.	Dec. 19, 25	40	206½	206½	205	206	0
103	63	66½	61½		10,000,000	100	Southern Pipe Line Co	$1Q	Mar. 1, 26	250	62½	63	x62¼	63	0
197	139	197	174		20,000,000	100	South Penn Oil Co	$1.50	Dec. 31, 25	3,050	177	178	175	175	—2½
47½	45	50	44¼		20,000,000	25	do new	.....	.....	300	45¼	45¾	44¼	44¼	— ½
84	50	54½	52½		3,500,000	100	South West Pa. Pipe Line	$1Q	Dec. 31, 25	100	52½	52¾	52½	52¾	0
.....	.....	58¾	54½	(sh)	15,000,000	N.P.	S. O. California (new)	.....	.....	43,000	58½	58¾	56¼	56⅝	—1¼
70¾	59½	70½	65⅛	$	223,756,258	$25	S. O. Indiana	62½cQ	Dec. 15, 25	41,200	67⅜	67⅜	x65⅝	66¼	—1
46	30⅜	36½	31½		8,000,000	25	S. O. Kansas	.....	June 16, 24	1,600	32¾	32¾	31½	32	— ¼
137	114¾	134⅜	124⅛		16,864,434	25	S. O. Kentucky	$1Q	Dec. 31, 25	2,100	125⅝	126⅜	124⅛	124⅛	—1⅞
270	231	254	239½		3,000,000	100	S. O. Nebraska	$5S.A.	Dec. 19, 25	80	248	248	240	247	—3
48⅝	40¼	47¼	35		227,535,300	25	S. O. New York	35cQ	Dec. 15, 25	11,300	36⅛	36⅜	x35⅝	35⅝	— ⅜
369	338	362	339½		14,000,000	100	S. O. Ohio	$2½Q	Jan. 1, 26	210	352	352	343½	346	—6
123	116	118½	117		7,000,000	100	do pfd	$1¾Q	Mar. 1, 26	20	118	118	118	118	+1
27	12	23	20		1,722,931	25	Swan-Finch Co	.....	Nov. 1, 19	.....	.....	.....	.....	.....	.....
109½	80⅛	109¼	102¼		61,919,950	25	Vacuum Oil Co	50cQ	Dec. 19, 25	6,900	105¾	105¾	102¼	103	—2⅛

Borne Scrymser $2 extra April 15 $4 extra Oct. 15 ‡Vacuum 50c extra Mar. 20, June 20, Sept. 19 Dec. 19 special $1 Dec. 19 S. O. Neb. $10 extra Dec. 19 Ohio Oil 50c extra Dec. 31. Chesebrough 62½c extra Dec. 29 Dec. 19 special $1 Dec 19 S.O. Neb. $10 extra Dec. 19

Gilliland Reports Larger Operating Income

NEW YORK, Feb. 22.—Gilliland Oil Co. for the year ended Oct. 31, 1925, reports income of $1,109,637 after expenses but before depreciation and depletion, as compared with $1,314,239 in the year ended Oct. 31, 1924.

Gilliland balance sheet of Oct. 31, 1925, shows an excess of $351,623 in current liabilities over current assets as compared with an excess of $193,089 on Oct. 31, 1924.

Income accounts for the two years compare:

	1925	1924
Total oper. rev.	$2,807,096	$2,847,416
Other income	33,554	34,695
Total income	$2,840,650	$2,882,111
Oper. exps.	1,731,013	1,567,872
*Oper. income	$1,109,637	$1,314,239

*Before depreciation and depletion.

Balance sheets compare:

ASSETS

	1925	1924
Property acct.	$8,202,855	$7,572,907
Bond disct.	360,324	428,389
Def. chgs.	10,328	10,315
Cash	23,418	45,416
Matls. & supplis.	224,913	277,277
Inventories	48,481	36,256
Matls. & supplis.	224,913	277,277
Deficit	467,319	.....
Total	$8,499,909	$8,591,786

LIABILITIES

Cap. stock	*$3,236,600	†$4,558,402
Funded debt.	4,265,754	5,587,025
Purch money obligations	66,291	78,319
Def. liabs	549,470	460,414
Conting. liabs	571,088	777,966
Notes payable	447,559	436,931
Accts. payable	302,481	275,051
Accrued taxes & wages	60,663	61,282
Total	$8,499,909	$8,591,786

*Represented by 32,366 shares of 6% preferred stock, (par $100) and 600,000 shares of common stock, (no par) value.
†Capital stock and deficit.

Leonard Oil Development Issues Statement

NEW YORK, Feb. 22.—Leonard Oil Development Co. has issued a balance sheet as of Jan. 15, 1926, showing total assets of $50,851,829 and current assets more than 8 to 1 over current liabilities. The balance sheet follows;

ASSETS

Cash	$ 1,443,321
Accounts Receivable	7,930
Properties held in fee	9,028,927
Leases and rights	39,494,551
Deposits with Ecuador	147,463
English land bonds	120,215
Road, development, equip	605,200
Deferred charges	4,222
Total	$50,851,829

LIABILITIES

Accounts payable	$ 80,282
Notes payable	17,037
Capital stock	46,401,300
Paid in surplus	4,353,210
Total	$50,851,829

Correction

Dividend rates and payment dates in Standard Oil stock table in issue of Feb. 17 beginning with National Transit Co. and following down the list were incorrect. Correct rates and dates were in the Feb. 10 issue and are in this issue.

New York Bonds

Week Ending Feb. 19

	High	Low	Last	Ch'ge
Amer Rep Cor deb 6s	99¾	98⅞	99	— ⅛
Associated Oil gold 6s	102⅞	102⅝	102⅞	+ ⅛
Atlantic Refg deb 5s	101	100¼	100⅛	0
Barnsdall Corp 6s	101	100	100⅛	— ⅛
Calif Petrol sf 6½s	104½	104	104⅛	+ ⅛
Empire Gas & F 7½s	102¾	102¼	102½	0
Gen Asphalt 6s	105¾	105¾	105¾	+ ⅛
Humble Oil & R 5½s	102½	102⅛	102½	+ ⅜
Mid-Cont Pet 6½s	104	103¼	103½	0
Pan-Amer P & T 7s	106½	105⅝	106¼	— ⅛
Pan Amer P & T 6s	107⅞	106¼	106¼	—1¼
Pierce Oil deb 8s	105⅝	102⅝	102⅝	—3⅛
Producers & Refnrs 8s	110	110	110	0
Sinclair Con Oil Col 7s	97½	96½	97	+ ¾
Sinclair Con Oil con 6½s	90½	89⅝	90¼	+ ⅝
Sinclair Con Oil 6s	112¾	109½	112¾	+2
Sinclair Crude Oil 6s	101	100¾	100¾	.....
Sinclair Pipe Line sf 5s	90¾	90¼	90¾	0
Skelly Oil 6½s	127¾	124¼	125	—2
Superior Oil 7s	97½	96¾	96¾	0
Union Oil of Calif 5s	101¼	100⅝	101¼	+ ⅝
Union Oil of Calif 5s-C	97	96¾	96¾	0
Union Tank Car 7s	.....	.....	.....	

New York Curb Bonds

Week Ending Feb. 19

	High	Low	Last	Ch'ge
Atl Gulf & W I 5s	73⅝	73	73	— ¼
Cities Service 6s	93⅛	93⅛	93⅛	+ ⅛
Cities Service 6s n	93⅜	93¼	93¼	0
Cities Service 7s B	180½	79	180½	+2½
Cities Service 7s C	127½	126	127½	+1¾
Cities Service 7s D	102½	101¾	102½	+ ¾
Galena S. O. 7s	102¾	102½	102¾	+ ⅜
General Pet 6s	101¾	101½	101½	— ¼
General Pet 5s	94¼	93⅞	94¼	0
Gulf Oil 5s	99¾	99¾	99¾	0
Pan Amer Pet 6s	103⅜	102¾	102⅞	— ⅝
Pure Oil 6½s	103½	103⅛	103⅜	+ ⅛
S O N Y 6½s	106¾	106½	106½	0
Sun Oil 5½s '25	99¾	99½	99¾	0
Tidal Osage 7s	104	104	104	0½
Trans Cont Oil 7s	95½	95	95	—
United Oil Prod 8s	44	40⅜	44	+4⅜
Vacuum Oil 7s	104½	104¼	104⅜	—

New York Curb Market

1925 High	1925 Low	1926 High	1926 Low	Par Value	Stocks	Transactions week ended Feb. 19 Sales	First	High	Low	Last	Ch'ge
11½	2½	14½	7¼	....	Amer. Maracaibo	18,700	9½	10	8½	9⅜	+ ⅛
8⅜	5	6¾	6	$10	Arkansas Nat. Gas.	1,000	6	6⅛	6	6⅛	— ⅛
.....	.....	19¼	18¼	N.P.	Beacon Oil	3,900	18½	18⅝	18	18¼	— ¼
47½	38	.....	.....	$25	British-American	.....	.....	.....	.....	.....	.....
10¼	2¾	22⅞	10	25c	Carib. Syndicate	114,700	15¾	19	14½	19	+3¼
43	35	39⅝	37½	$20	Cities Service	15,300	x38¼	*x39⅝	x38¼	x39⅝	+1¼
85⅛	80¼	84	83¼	100	do pfd.	2,200	x85½	x83¾	x83¼	x83¾	+ ¼
8	7¼	7½	7⅜	10	do pfd. B	100	x 7½	x 7½	x 7½	x 7½	+ ⅛
21⅜	17¾	19⅜	19	10	do bankers' sh	100	x19¼	x19¼	x19¼	x19¼	— ⅛
2¾	.60	3½	2⅛	N.P.	Colombia Syndicate	37,900	3⅛	3¼	‡ 2⅛	2⅛	— ⅛
15	8¼	15¼	12¼	N.P.	Creole Syndicate	13,000	13¾	13¾	‡12¼	13	—1
12¼	5	7⅜	4	N.P.	Crown Central	3,900	4⅞	5⅛	‡ 4	4	— ¾
7	2	3¾	2⅜	N.P.	Derby Oil & Ref	600	2¾	2¾	2½	2½	0
27	10½	14⅞	13½	N.P.	do pfd.	.....	.....	.....	.....	.....	.....
6	1⅜	7	5	N.P.	Gibson Oil	94,400	5⅛	* 7	5½	5⅛	0
3¾	1⅜	2	1	N.P.	Gilliland v.t.c.	1,400	1½	1½	‡ 1	1	0
98¼	63½	93¾	86½	$25	Gulf Oil Corp.	3,800	89½	89¾	87½	87½	—1
5⅞	2¼	3¾	2¼	N.P.	Kirby Petroleum	1,000	2⅞	2⅞	2½	2½	— ⅛
23¼	17⅞	25⅞	21	N.P.	Lago Oil & Trans. A	68,100	24	24½	22½	23¾	—1⅛
11¾	4⅛	13	10½	N.P.	Lago Petroleum	11,100	12¼	12¼	10⅞	11½	— ½
13	6	12¼	9	N.P.	Leonard Oil & Dev.	108,300	10½	*12¼	10	12	0
25⅞	18	25½	23¾	N.P.	Lion Oil Refining	5,200	24¼	25½	24¼	25½	+1¼
4¼	1¾	.....	.....	N.P.	Marland of Mexico	.....	.....	.....	.....	.....	.....
5¾	.56	5½	5	$10	Mexican-Panuco	21,200	5¼	5¼	4¾	5	— ⅛
2	1	1¾	1⅝	1	Mountain & Gulf	.....	.....	.....	.....	.....	.....
26¼	18¾	26	23¾	10	Mountain Prod	9,400	24⅜	25	24	25	+ ⅛
6¾	3⅝	6¾	6	5	New Bradford	7,700	6¼	6⅝	6¼	6⅜	+ ⅛
24¾	16¼	5	4½	10	New England Fuel	100	4½	‡ 4½	4½	4½	— ⅛
19¾	6¼	17	12¾	1	New Mex. & Ariz	3,500	13⅜	13¾	13	13½	+ ¼
12½	8¼	17	11⅝	25	New York Oil	300	13⅛	13⅛	12⅞	13	— ½
37	14	36	34¼	25	Ohio Fuel Corp	.....	.....	.....	.....	.....	.....
2½	.90	2¾	1¾	N.P.	Peer Oil Corp	15,300	2⅛	2⅛	‡ 1⅜	1½	— ¾
28½	16	22¾	20¾	$10	Pennok Oil	600	21½	21½	21	21	0
44½	16	21½	17⅜	25	Red Bank Oil	400	19¼	19¼	17⅞	17⅞	—1⅜
33⅜	19	24⅞	14½	N.P.	Reiter-Foster	5,700	21	21	15⅞	18	—3
9½	3½	7½	5⅞	N.P.	Ryan Consolidated	4,800	6	7⅜	6	7¼	+1⅜
9¾	6⅝	10	9	$10	Salt Creek Cons	1,300	9⅞	10	9¾	10	+ ⅛
35	24	36	31½	10	Salt Creek Prod	5,000	32½	32½	31⅝	32¼	— ¼
3⅞	1	2	1⅜	5	Savoy Oil	100	2	2	2	2	+ ¼
13¾	9	10	9	10	Tidal Osage	.....	.....	.....	.....	.....	.....
10⅞	8	10	9	10	do non-voting	.....	.....	.....	.....	.....	.....
4⅞	1¾	8	4¼	5	Venezuelan Pet	40,600	7¼	7¼	6½	7¼	0
.....	.....	29¾	24¾	....	Warner-Quinlan w.i.	1,800	28⅛	28⅜	26¼	27½	— ⅜
31¼	22¼	27⅜	25	N.P.	Wilcox O. & G. new	1,300	26	26	25¼	26	+ ¼
7	3⅞	6	5¼	N.P.	Woodley Petroleum	800	5¾	6	5¾	6	+ ⅛

Pittsburgh Stock Exchange

1925 High	1925 Low	1926 High	1926 Low	Par Value	Stocks	Transactions Week Ended Feb. 19 Sales	First	High	Low	Last	Ch'ge
8¼	5¼	7	6	$10	Arkansas Nat. Gas.	1,220	6⅛	6⅛	6	6	— ⅛
73¼	69¼	.....	.....	N.P.	Columbia Gas	.....	.....	.....	.....	.....	.....
21⅛	21⅛	.....	.....	50	Consolidate Gas pfd.	.....	.....	.....	.....	.....	.....
18	14½	17	15½	$10	Devonian Oil	130	15⅞	15⅞	†15½	15½	— ½
112¾	105⅛	114	112¾	$100	Duquesne Lt. 7s pfd.	40	113½	113½	113½	113½	— ½
95	90	.....	.....	100	Fayette County Gas	.....	.....	.....	.....	.....	.....
.....	.....	10	9¼	....	HoustonGulfGas(w.i.)	3,435	9	10	9	9¼	0
55	32½	56½	51¾	25	Lone Star Gas	1,795	54½	55	54¼	55	+ ¼
7	3¾	6½	6	....	do Rights	.....	.....	.....	.....	.....	.....
37¼	31	36½	35	25	Ohio Fuel Corp	2,415	35⅜	35⅜	35½	35⅝	— ⅛
34	26	34	31½	25	Oklahoma Nat. Gas	3,426	33	33	32	32	—1
8¾	5	5¾	5	5	Pittsburgh O. & G	253	5¼	5¾	†5	5	.....
9¾	6	10	9	10	Salt Creek Cons	150	9⅞	10	9⅞	10	+ ⅛
15¾	8½	10	9	10	Tidal Osage	80	9	9	†9	9	— ¾

Pittsburgh Curb Market

1925 High	1925 Low	1926 High	1926 Low	Par Value	Stocks	Transactions Week Ended Feb. 19 Sales	First	High	Low	Last	Ch'ge
20	18½	.....	.....	....	Central Ky. Gas	.....	.....	.....	.....	.....	.....
2¼	.60	3¾	2¾	$ 5	Colombia Synd	.....	.....	.....	.....	.....	.....
.60	.15	15	15	5	Duquesne Oil	.....	.....	.....	.....	.....	.....
9	5½	.....	.....	10	Forest Oil	.....	.....	.....	.....	.....	.....
92¾	64	91½	90	25	Gulf Oil Corp	.....	.....	.....	.....	.....	.....
.....	.....	10	6½	....	Houston Gulf Gas	.....	.....	.....	.....	.....	.....
12½	3¼	12	9¾	N.P.	Leonard Oil & Dvlp	825	11	*12	11	12	+1½
2¾	1⅜	.....	.....	1	Oklahoma Eastern	.....	.....	.....	.....	.....	.....
¾	⅜	.....	.....	....	Okla. Eastern rts	.....	.....	.....	.....	.....	.....
1⅜	1⅛	.....	.....	....	Okla. Eastern ex-rts	.....	.....	.....	.....	.....	.....
.47	.20	.20	.20	10	Omar O. & G	500	.19	.19	.19	.19	—.01
27½	25	33	27	10	Plymouth Oil	.....	.....	.....	.....	.....	.....
7	3	4	3	5	States Oil	.....	.....	.....	.....	.....	.....
4	1⅞	3½	2¾	$ 1	Texon Oil & Land	2,385	2⅛	3	2¾	3	0
11	9	9½	9¼	10	Tidal Osage	.....	.....	.....	.....	.....	.....
.....	.....	42¾	42	N.P.	Waverly Oil Wks. A	1,700	42¾	42¾	42	42	.....

*New High ‡New Low xEx Dividend

Financial Notes

Barnsdall Corp.—Earnings in January from its California properties amounted to $361,000 after depreciation and depletion. $5,569,200 additional class A voting stock and $25,000,000 class B non-voting stock admitted to New York Stock Exchange. Shares of both classes are $50 par. $25,000,000 15-year 6% sinking fund gold debentures also listed.

Lago Oil & Transport Co.—Application made to list on New York Stock Exchange 3,000,000 no par class A shares.

Associated Oil Co.—Application made to list on New York Stock Exchange 4,000,000 additional common stock, par $25 per share.

South Penn Oil Co.—Split of stock into shares of $25 par each will become effective March 26 to stockholders of March 15 record. Four shares of the $25 stock will be issued for each $100 share outstanding. Fractional shares will not be issued, but the company will pay for fractions in cash at the average selling price between March 16 and March 26.

Peerless Starts Cracker

TULSA, Feb. 23.—The Peerless Oil & Refining Co. began operation of its new cracking plant on Feb. 16. The pressure unit is of the Jenkins process with a capacity of 1000 barrels of cracking stock per day.

Oil Dividends

	Amt.	Payable	Stock of Record
Barnsdall A q	50c	Apr. 2	Mar. 15
do B q	50c	Apr. 2	Mar. 15
Beacon Oil pfd. q	$1.87½	Feb. 15	Feb. 4
California Pet. q	50c	Mar. 1	Feb. 20
Cities Service m	10c	Apr. 1	Mar. 15
do stock	½%	Apr. 1	Mar. 15
do pfd. m	50c	Apr. 1	Mar. 15
do pref. B m	5c	Apr. 1	Mar. 15
Cumberland P. L. q	$3	Mar. 15	Feb. 27
National Transit extra	25c	Mar. 15	Feb. 27
Marland q	$1	Mar. 31	Mar. 20
S. O. New Jersey q	25c	Mar. 15	Feb. 25
do pfd. q	$1.75	Mar. 15	Feb. 25
S. O. New York q	35c	Mar. 15	Feb. 19
S. O. Ohio q	$2.50	Apr. 1	Feb. 26
Sun Oil q	25c	Mar. 15	Feb. 15
Texas Co. q	75c	Mar. 31	Mar. 15
Valvoline Oil q	1½%	Mar. 17	Mar. 13
Chesebrough Mfg. q	75c	Mar. 31	Mar. 10
do extra	25c	Mar. 31	Mar. 10
Shell Union q	35c	Mar. 31	Mar. 1
Tidal Osage pfd. q	1¾%	Mar. 1	Feb. 22

Cleveland Stock Market

	Par	Feb. 20 Bid	Asked	Last Sale
Canfield Oil Co	$100	108½	125	115
do pfd	100	.....	105	100
Fred G Clark Co	10	2¾	4	4
National Refin. Co. x	25	.....	42	41
do pfd	100	128	135	129½
Paragon Refin. Co	25	8	8¼	8¼
do pfd	100	67	69	67

x-Exdividend

The Oil Industry Exchange

Positions Wanted

Specialist in all grades Greases, Soluble Oils, Castors, Non-Chatter Bases, Soaps and General Compounding, desires new connection. Box 529.

Experienced Filling Station Builder and Pump Repair Mechanic with field pump engineering experience, seeking high-class connection. Best references. Box 523.

Desire connection with reliable company planning cracking equipment. Ten years experience with various systems. Capable taking complete charge. Box 530.

Position on Engineering Staff wanted—eight years experience on installation and operation of electrical and mechanical equipment in field. Pumps, motors, gas engines, electrical and oil distribution lines, tanks, etc. Age 38, married. Western location preferred. Address Box 522.

Situations Open

Salesmen — Oil, Grease, Paint and Roof Cement. Quality line at prices that eliminate competition. Permanent connection with exceptional possibilites. Old established, square dealing, aggressive organization. Weekly and monthly settlement in real money, not promises. Auto furnished after qualifying. If $60.00 weekly interests you to start give age, experience and references. P. O. Box 1735, Pittsburgh, Pa.

WANTED

MAN who is familiar with the problems of oil refining industry, who has intimate knowledge of the operating and engineering men in this field. Services required are for one who has sales ability as well as operating or engineering experience.

In answering send all details to Box 203

32 West 40th Street
New York

Miscellaneous

WHAT IT COSTS

For "Position Wanted" advertisements—5 cents per word. Minimum cost $1.00. All other classified advertising—10 cents per word. Minimum cost $3.00. Advertisements set in special type or with border—$4.00 per column inch. Copy must reach us not later than Friday preceding date of issue. All advertisements carried on this page are payable in advance.

Business Opportunities

Manufacturer's-Jobber's Representative—New Jersey Clientele established fifteen years, will sell business due to sickness. Box 525.

Experienced Tank Truck Drivers: If you are honest and intelligent you can start a business of your own with a small amount of capital. Advise experience and give references. Box 527.

Investment

Financial group willing to invest capital in refinery having own production, in existence at least three to four years and able to prove satisfactory results.

Box 524

Independent Filling Station Owners: Do you want to more than double your profits with only a small additional investment? Advise gallonage and grades of gasoline handled. Box 526.

Special Winter Zero Oils From Mid-Continent Crude

MOTOR, TRACTOR AND INDUSTRIAL

From Mid-Continent, Gulf Coast and Penna. Crude. Attractive prices for spot or contract, also Gasoline, Kerosene, Distillate, Fuel Oil. Buying orders promptly executed on small commission basis.

Arkoma Petroleum Co.
722-23 Mid-Continent Bldg.
Tulsa, Okla.

For Sale

7500-Gal. Railroad Gas or Oil Tank For Sale. Good condition, never been buried, suitable for storage purposes. Burr Oak Mill and Elevator, Burr Oak, Kansas.

Filter Equipment for Sale

All or part of complete filter equipment consisting of 5-Three ton, and 6-Two ton capacity filters. Mounted on separate steel frame. 5 Steel earth cars—2 Steel charging cars on track. Also one new Century Earth Burner—All in good condition—very low price. Address: The Superoil Company, Toledo, Ohio.

Advertisers having box numbers should be addressed in care of National Petroleum News, 817 Huron road, Cleveland, Ohio, unless otherwise specified.

ADVERTISERS INDEX

National Petroleum News

Adamson Mfg. Co.
Allison Coupon Co. 88
Aluminum Paint Co.
American Bridge Co.
American Can Co.
American Oil Corp 66
American Oil Pump & Tank Co. 105
American Radiator Co. 13
American Schaeffer & Budenberg Corp.
American Spiral Pipe Works.
American Steel Package Co. 103
American Telephone and Telegraph Co.
Armstrong Cork & Insulation Co.
Associated Supply Co. 67
Attwood Brass Works, Inc.
Autocar Co.
Au-to Compressor Co.
Automobile Rotary Lift Co. 71

Barber Co., W. H.
Barnickel & Co., Wm. S. 84
Barnsdall Refg. Co.
Battenfeld Grease & Oil Co.
Bell Oil & Gas Co. 2
Bennett Pumps Corp.
Berry's Sons Co., James B.
Bessemer Gas Engine Co. 52
Bethlehem Shipbuilding Corp. 63
Bethlehem Steel Co.
Blackmer Rotary Pump Co. 72
Blaw-Knox Co.
Bolene Refg. Co.
Bowser & Co., Inc., S. F. 20
Brookins Mfg. Co.
Brown Sheet Iron & Steel Co. 101
Buckeye Iron & Brass Works 5
Budd Wheel Co. 89
Buffalo Meter Co. 98
Butler Mfg. Co.

C-V Equipment Co.
Calorizing Co.
Cameron, A. S. Steam Pump Works.
(Ingersoll-Rand Company).
Canfield Oil Co., Cleveland 22-23
Carbide & Carbon Chemicals Corp.
Caward Dart Co.
Central Commercial Co.
Champion Pneumatic Mach. Co.
Champion Tank & Mfg. Co.
Champlin Refining Co. 4
Chapman Valve Mfg. Co.
Chestnut & Smith Corp. 114
Chicago Bridge & Iron Works.
Chicago Tubing & Braiding Co.
Christian-Able Co., Inc.
Cincinnati Advertising Products Co. 77
Cincinnati Ball Crank Co.
Clark Co., Fred G.
Classified Advertising Section. 127
Cleveland Brass Mfg. Co.
Cleveland Steel Barrel Co.
Columbia Oil Co.
Columbian Steel Tank Co. 3
Conewango Ref. Co.
Continental Motors Corp.
Continental Ref. Co.
Cook Paint & Varnish Co. 8-9
Correct Measure Co.
Cosma Laboratories.
Crane Co.
Crown Central Petroleum Corp. Outside Back Cover
Curtis Pneumatic Machinery Co. 21
Cushing Refg. & Gasoline Co.

Damascus Manufacturing Corp.
Davis Welding & Mfg. Co. Inside Back Cover
Dayton Pump & Mfg. Co. 16-17
Deepwater Oil Refineries. 6
Dempster Mill Mfg. Co.
Detroit Graphite Co.
Draper Mfg. Co.
Du Pont Everdur Co.

Economy Engineering Co.
Edwards Mfg. Co.
Edward Valve & Mfg. Co. 63
Elk Refining Co.
Emerson-Scheuring Tank Co.
Empire Oil Works, Inc. 107
Empire Refineries, Inc. 94
Erickson Co., Inc. C. E.
Erie Service Station Equipment Co.

Fairbanks, Morse Co. Insert
Farrell Mfg. Co.
Fiske Bros. Refg. Co.
Fleckenstein Visible Gasometer Co. of Michigan
Flexlume Corp.
Foamite-Childs Corp.
Ford Motor Co.
Forney Fibre Co. 67
Freedom Oil Works 116
Frontier Mfg. Co.
Fuller & Sons Mfg. Co.

Galena Signal Oil Co.
General American Tank Car Corp.
General Motors Truck Co.
Gilbert & Barker Mfg. Co. 7
Glidden Co.
Globe Mfg. Co.
Globe Oil & Refg. Co.
Gomory, W. L.
Goodrich Rubber Co., B. F. 73
Graham Brothers.
Graver Corp.
Groetken Pump Co. 68
Guarantee Liquid Measure Co. 110-111
Gulf Ref. Co. 98

Handy Oiler Co.
Hayes Equipment Mfg. Co. 83
Heil Co., The.
Highland Body Mfg. Co.
Hope Engineering & Supply Co. 61
Hughes Tool Co. 80
Humble Oil & Refining Co.
Huntley & Huntley
Hyde-Schneider Haley Mfg. Co.

Illinois Glass Co. 93
Imperial Oil Marketing Co.
Independent Oil Men of America
Indian Refg. Co.
Ingersoll-Rand Co.
(A. S. Cameron Steam Pump Works).
International Harvester Co.
Irving Iron Works Co. 101

Jenkins Bros. 54
Johns-Manville Co., H. W.

Kanotex Ref. Co.
Keen & Woolf Oil Co. 88
Kellogg Co., M. W.
Kellogg Mfg. Co.
Keystone Oil & Mfg. Co.
Klean Rite Auto Laundry Co.

Lake Petroleum Co.
Leader Iron Works.
Lee Mercantile Co., H. D.
Lewis-Shepard Co.
Linde Air Products Co.
Lipman Pump Works. 51
Luce Trunk Co. 109
Lucey Mfg. Co.
Ludlow Valve Mfg. Co.
Ludlum Steel Co.

Marland Refg. Co. 74
Marvel Equipment Co. 110-111
Mathieson Alkali Works Inc.
McDonald Mfg. Co., A. Y.
McSavaney Co.
Merit Oil Equipment Co. 79
Metal Hose & Tubing Co. 15
Metric Metal Works.
Meyercord Co.
Midland Specialties Co.
Miller & Co., Inc. Max B.
Miller Petroleum Co.
Miller Sons Co., A. D.
Milwaukee Tank Works. 87-Inside Front Cover
Mohawk Rubber Co.
Morrison Bros.
Mullins Body & Tank Co.
Murdock Mfg. Co. 66

National Carbon Co., Inc.
National Distributing Co.
National Petroleum Marketers Assn.
National Petroleum Mutual Fire Ins. Co.
National Petroleum News. 12-62-86-108
National Recording Pump Co.
National Refining Co. 109
National Transit Pump & Machine Co. 62
Neil & Co., Wm.

Ohio Valley Refg. Co.
Ohmer Fare Register Co.
Oil Conservation Engineering Co.
Oil Well Supply Co.
Oxweld Acetylene Co. 58

Page Steel & Wire Co.
Pennsylvania Refg. Co.
Pennzoil Co.
Petroleum Iron Works Co. 11
Pforzheimer & Co., Carl H.
Platt Co., W. C. 118
Power Specialty Co.
Pressed Steel Tank Co. 57
Prest-O-Lite Co.
Producers & Refiners Corp.
Professional Card Section.
Pulte-Korreck Machine Co. 68
Pure Oil Co.

Quaker City Iron Works.
Quincy Compressor Co. 19

Rand, McNally & Co.
Raymond Garage Equipment Co.
Reading Steel Castings Co., Inc.
Refinery Products Directory. 106
Rhodes Co., Jay B.
Richmond Engineering Co.
Rock Island Lines.
Roper Corp., Geo. D.
Roxana Petroleum Corp. 18
Royer Pump & Equipment Co.

St. Louis Can Co.
St. Louis Pump & Equipment Co.
St. Louis Steel Package Co.
St. Louis Surfacer & Paint Co. 24
Savegas Pump Sales Corp.
Schock Co., W. O.
Service Recorder Co
Sharples Specialty Co.
Sherwin-Williams Co.
Sinclair Refining Co. 112
Sistersville Tank & Boiler Works.
Skelly Oil Co.
Spencer Petroleum Co.
Steinke Bros. Mfg. Co.
Sterling Oil Co.
Stevens Grease & Oil Co., A. J.
Sun Oil Company.

Tagliabue Mfg. Co., C. J. 54
Texhoma Oil & Refg. Co.
Tide Water, Oil Co.
Tokheim Oil Tank & Pump Co. 10
Transcontinental Oil Co. 14
Trimont Mfg. Co.
Truscon Steel Co.

Union Metal Mfg. Co.
United Filters Corp.
U. S. Air Compressor Co.
United States Cast Iron Pipe & Foundry Co.
Universal Oil Products Co. 51

Van Tine, C. C.
Viking Pump Co.
Vilter Mfg. Co.
Visible Pump Co.
Vogt Machine Co., Henry 72

Wackman Welded Ware Co.
Wayne Tank & Pump Co.
Western Mfg. Co. 78
Wheaton Brass Works, A. W. 49
White Eagle Oil & Refg. Co.
White Engineering Corp., J. G.
Wichita Pump & Equip. Co.
Williams Sealing Corp.
Wilson Welder & Metals Co., Inc.
Worthington Pump & Machinery Corp.

Youngstown Boiler & Tank Co. 97
Youngstown Welding Co. 99